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FATS AND OILS
WORLD
PRODUCTION AND TRADE

by

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FOREWORD

This study covers only the principal edible and industrial fats and oils. Corn oil is omitted, because it is commercially important only in the United States. Two whole groups - the vitamin oils and the essential oils - are also omitted.

An attempt has been made to furnish the latest economic information available for each commodity and to give sufficient background to indicate trends in production and trade. A large amount of statistical data for the war years is not yet available. Commodity discussions have been limited largely to the principal producing, trading, and consuming countries.

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WORLD FATS AND OILS PRODUCTION AND TRADE

SUMMARY

World production, trade, and consumption of fats and oils have increased materially during the past four decades. Expansion in demand has been due, in part, to increased population and, in part, to technological developments leading to increased per capita utilization, particularly of vegetable oils and whale oil. During World War II, blockades, enemy occupation of producing areas, and inadequate shipping seriously curtailed production and consumption and depleted stocks. In 1946, production is still relatively small, whereas the demand is strong.

Total world production of visible fats and oils available for consumption in 1946 is estimated to be about 20 percent smaller than the 1935-39 average. The total quantity available for international trade in 1946 is estimated at about 3 million short tons as compared with 6.5 million, the average amount moving annually from original sources during 1935-39.

PRODUCTION

World production of fats and oils in 1945 was placed at 17,300,000 short tons, compared with the prewar (1935-39) annual average of 21,600,000 tons. Production of every group of fats and oils was below the prewar level (table 1). The greatest reduction in output was in the palm oils (coconut, palm oil and palm-kernel); this has occurred in the Netherlands Indies and the Philippines, formerly two of the major producing areas. ~~Marine oils were~~ also substantially below prewar production. The 1945 production of edible oilseeds was only about 10 percent below the prewar output. In the edible group, the greatest declines were in cottonseed and olives, attributed, respectively, to the reduction in cotton acreage and to the 1945 drought in the Mediiterranean Basin. On the other hand, sunflower-seed production exceeded in prewar level. In fact, the two phenomenal developments in vegetable-oilseed production that occurred during the war were expansions in Argentine sunflower-seed and United States soybean production.

Fats and oils available for consumption in 1946 are those obtained largely from the oilseed crops and olives harvested in the fall of 1945 and from animal fats, marine oils, and palm oils from the current year's production.

The production of palm oils is expected to be some 200,000 tons greater this year than in 1945. The increase is largely the result of the rehabilitation of the copra industry in the Philippines, where the output this year is expected to equal more than 50 percent of the prewar average. Small quantities of copra are expected also from the Netherlands Indies, but the total annual output of palm oils this year will be at least one million tons below the prewar level.

The 1946 world production of animal fats is expected to be slightly below that of 1945 and about 15 percent below the prewar level. The reduction is due, in a large measure, to the decline in butter production in Europe and the United States. The total lard production is also somewhat below the prewar level on account of the reduced hog numbers in European countries.

The 1946 whale-oil production, estimated at 160,000 tons, is materially larger than that of 1945 but is equal to only about 25 percent of the 1935-39 output. The 1946 fish-oil yield is also estimated at only about 50 percent of the prewar level.

TABLE 1. - *Fats and Oils: Estimated world production,*[1] *average 1935-39, annual 1945*

COMMODITY	TOTAL IN OIL OR FAT EQUIVALENT	
	AVERAGE 1935-39	ESTIMATE 1945
	1,000 short tons	*1,000 short tons*
Edible Oils:		
Soybeans	1,360	1,240
Sunflower seed	630	865
Peanuts	1,615	1.660
Cottonseed	1,675	1,150
Olive oil	960	575
Sesame seed	675	565
Total	6,915	6,055
Palm Oils:		
Copra	1,610	700
Palm kernels	375	275
Palm oil	670	315
Babassu kernels	30	35
Total	2,685	1,325
Industrial Oils:		
Flaxseed	1.170	1,165
Castor-beans	200	205
Rapeseed	1,365	1,335
Oiticica oil	10	15
Tung oil	150	90
Perilla seed	65	50
Total	2,960	2,860
Animal Fats:		
Butter	3,750	2,835
Lard	3,000	2,400
Tallow	1,400	1,600
Total	8,150	6.835
Marine Oils:		
Whale	585	40
Fish	315	160
Total	900	200
Estimated world total	21,610	17,275

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[1] The production for each commodity was determined by estimating the percentage of each used as visible fats and oils. Allowances were made for seed, feed, and oilseeds consumed directly for human food. Since export figures are the only reliable data available, for most palm oils an additional percentage was added for local consumption in order to arrive at total production. The following percentages were used in arriving at total production of visible fats and oils:

Percentage	*Commodities*	*Percentage*	*Commodities*
125	Copra, palm oil	90	Sunflower seed, rapeseed, flaxseed, perilla
110	Palm kernels	85	Sesame
100	Olive oil, babassu, oiticica, tung, lard, tallow, whale and fish	81	Butter
		75	Cottonseed
95	Castor-beans	65	Soybeans
		60	Peanuts

INTERNATIONAL TRADE

World War II disrupted normal trade in fats and oils to a greater extent than production. By the middle of 1940, continental-European countries, normally importers of over 2 million tons, were largely cut off from prewar import sources. Following Pearl Harbor and Japanese occupation early in 1942 of the principal oilseed-exporting areas in the Far East, Japan controlled the countries which formerly contributed about 35 percent of the international trade. From 1942 to 1944, only about 2.5 million tons of fats, oils, and oilseeds, in terms of oil, annually entered foreign trade, compared with the prewar average of 6.5 million tons.

The total supply available for meeting the 1946 import requirements is estimated at less than 3 million short tons, but, because of delayed Argentine exports, all of this cannot be moved. The greatest shortage, as compared to prewar trade, is in the group of palm oils. (See table 2.) A tremendous decline in the supply of edible vegetable oils available for trade movement is also apparent. Reductions in all commodities of this edible group are evident, with the exception of sunflower oil.

The import requirements for fats and oils in 1946 are about double the supply available for export. The demand in Europe exceeds that of the prewar years on account of the sharp decline in production of animal fats and butter, the reduced oilseed production in the Balkan countries, and the small 1945 Mediterranean olive harvest.

International trade in fats and oils this year, as well as during the past 4 years, is being influenced by allocations recommended by the International Emergency Food Council (formerly the Combined Food Board) in an attempt to arrange equitable distribution of export supplies and to prevent severe competition among importing countries for supplies available. Otherwise, with the present world-wide shortage, the countries best able to arrange purchases could obtain the bulk of the available fats and oils.

OUTLOOK

The expectation is that 3 years or longer may be required for world production again to reach the 1935-39 level. Several factors are retarding the rise in production of various commodities to the prewar volume. On account of political unrest, it may take some years to restore Manchurian soybean production and the Sumatra palm-oil output. Whale-oil production is not expected to reach the prewar level, because of international agreements to limit the annual output in the Antarctic to about one-half the 1938 level.

On the other hand, the expanded sunflower-seed production in Argentina is expected to continue. The United States lard and soybean production will probably remain for some time above the 1935-39 level. Furthermore, several countries may subsidize domestic production in order to reduce import requirements.

The quantity of fats and oils available for international trade may remain below the 1935-39 level for some years, because several producing areas, such as India, may consume a larger quantity of domestic production. On the other hand, the import demand may not absorb so large a volume. The postwar demand is likely to follow a slightly different pattern than that of the 1930's. The demand in the Latin American countries, as a group, may be at a high level; at least, for a few years on account of the increased buying power. In the United States and Canada, the postwar industrial activities should create a strong demand for both edible and industrial oils. In Europe the demand is expected to be varied. The United Kingdom, the Soviet Union, and some of the smaller countries will undoubtedly have a high industrial activity and a strong demand for fats and oils. On the other hand, recovery in Germany may be slow.

World production of fats and oils is expected to expand during the next few years despite the prospect that a decline in prices may occur within that period. How soon it will be before production exceeds demand at current prices depends upon many factors, such as: (1) Weather conditions affecting production in the major producing areas; (2) political stability in such areas as Manchuria and the Netherlands Indies, which will affect the volume of available supplies; and (3) the ability of the deficit countries to finance their imports. Furthermore, if world prices advance to an unreasonably high level, import requirements will shrink rapidly and a temporary surplus of fats and oils would appear likely.

TABLE 2. - *Fats, Oils, and Oilseeds: Total exports from the principal producing countries as oil or fat equivalent, average 1935-39, annual 1946*

COMMODITY	TOTAL IN OIL OR FAT EQUIVALENT	
	AVERAGE 1935-39	ESTIMATE 1946
	1,000 short tons	*1,000 short tons*
Edible Oils:		
Cottonseed	190	35
Olive oil	174	10
Peanut	852	385
Sesame	65	15
Soybean	440	60
Sunflower	32	90
Total	1,753	595
Palm Oils:		
Coconut	1,289	450
Palm kernel	342	250
Palm	535	265
Babassu kernel	20	25
Total	2,186	990
Industrial Oils:		
Linseed	714	320
Castor	101	100
Rapeseed	45	10
Oiticica	4	10
Tung	[1] 89	30
Perilla	40	0
Total	993	470
Animal Fats:		
Butter	[2] 460	285
Lard	190	330
Tallow[2]	195	110
Total	845	725
Marine Oils:		
Whale	584	160
Fish	150	50
Total	734	210
Grand total	6,511	2,990

[1] 1933-37 average.

[2] 1934-38 average.

COTTONSEED AND OIL

SUMMARY

World production of cottonseed in 1945 is estimated at about 10.2 million short tons, compared with 11.3 million tons in 1944 and the 1935-39 average of 14.9 million tons. Cottonseed is one of the world's major sources of vegetable oil. From the average prewar output of 14.9 million tons of cottonseed around 1.7 million tons of oil were obtained, or about 20 percent of the estimated world production of all edible vegetable oils and about 8 percent of the world output of all fats and oils. Not more than three-quarters of the total cottonseed production is crushed for oil, large quantities being used for planting, and as feed and fertilizer. The fact that only about 5 percent of the total world production entered international trade during the 10 years ending with 1939 is indicative of the popularity of cottonseed in producing countries. (See fig. 1)

OUTLOOK

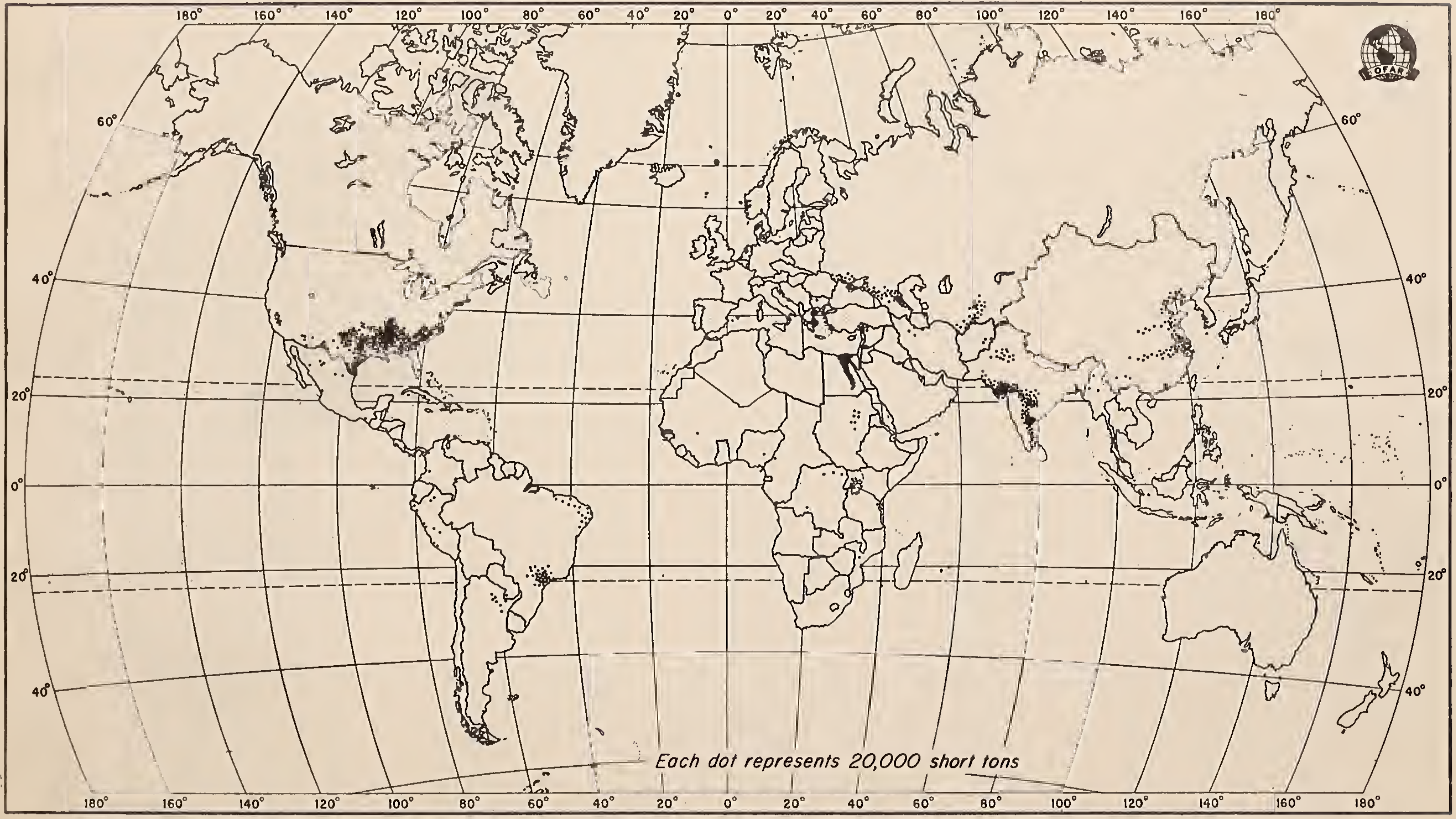
Since the volume of cottonseed output is directly related to the demand for cotton, the postwar situation in this oilseed will depend almost entirely upon the production and utilization of cotton. The present outlook is for increased cotton production during the next 2 or 3 years, but it probably will not exceed the 1935-39 level. In most of the African and Asiatic countries, output after 1946 is expected to be at least equal to that of normal times. Production of cotton in the Soviet Union and China in 1946, although on the increase, will still be below prewar levels. Any increase in these countries will not particularly affect world trade because of growing domestic requirements. In the United States production may not soon exceed to the 1935-39 level of around 6 million tons. Output in Brazil may be curtailed from its present high level because of United States competition, or by international agreement. The other producing countries of the Americas may continue to produce cotton and cottonseed about on the same level as before the war with some increase in Argentina, Mexico, and the deficit-producing countries.

Domestic markets, except in Egypt, the Sudan, British African Colonies, Argentina, and Brazil, appear likely to continue to absorb most of their cottonseed production locally, as was the case before the war. If cottonseed-oil prices remain on a competitive level with similar edible oils, such as soybean and peanut, then trade in cottonseed oil may again reach prewar volume. A limiting factor, however, may be the domestic consumption of this oil in the producing countries. Consumption in these countries, if maintained at wartime levels, would leave smaller quantities for export.

TYPES AND USES

Cottonseed has an oil content ranging from 14 to 25 percent, with the average rate of extraction being 15 percent. Crude cottonseed oil may be red, amber, or black, depending on the method of manufacture. After processing, the refined oil is used as a cooking and salad oil. When hardened by hydrogenation, it is used as a shortening, or is mixed with other fats to make compounds. The foots remaining after refining are mainly used as soap stock.

In the United States cottonseed oil is generally the leading constituent of shortening, margarine, and some salad and cooking oils. In the United Kingdom during



Each dot represents 20,000 short tons

FIGURE 1.-World cottonseed production, average 1935-39

1933-37 this oil constituted about 34 percent of all the materials utilized in compounds and 8 percent of those used in margarine. Except for a short period prior to World War I, the countries of continental Europe have never been important consumers of cottonseed oil. In other countries, its significance in edible products has varied, depending upon the relative abundance, or scarcity, and prices of other fats and oils produced locally or imported.

PRODUCTION

World cottonseed production showed little change from the 1930-34 depression level of 12.4 million tons until 1936, when a sharp increase to about 15.9 million tons occurred (table 3). The pattern of distribution, however, was considerably changed during the 1930's. Reduced production in the United States was more than offset by increases in practically all other cotton-producing countries, particularly in Brazil, the Soviet Union, and China. World production reached an all-time record of about 18 million tons of cottonseed in 1937, when production in the United States rose to about 8.5 million tons. Production in other countries showed a small net decrease in that year.

During the war years, since 1940, cotton acreage was reduced as a result of government action in Egypt and India; by disorganization due to military operations in China and Russia; and by various causes in East Africa. Production in the United States during this period fluctuated at levels 7 to 15 percent under the 1935-39 average. The output in 1945 was only 3.6 million tons, which was the first marked decrease in many years. In most of the other American countries, production has been maintained or increased largely because of favorable prices supported by government cotton loans and increased local demand for cotton.

TRADE

World trade in cottonseed in normal times consisted largely of the movement of cottonseed from Egypt, the Sudan, and British African Colonies to the United Kingdom until this trade was virtually abandoned in 1940 because of war. In 1938, the last full prewar year, British imports of cottonseed represented about 80 percent of the world total, and exports from British Empire areas, mostly to the United Kingdom, represented nearly 75 percent of world exports. Japan imported considerable quantities of cottonseed during 1935 through 1937, mostly from the Asiatic mainland; that is, China, Manchuria, and Korea. Brazil entered the export market on an important scale about 1935. (See table 4.)

World cottonseed imports averaged over 880,000 short tons during 1935-38. They declined to about 660,000 tons in 1939 and practically disappeared from allied and neutral countries after 1940. Reduced production and restriction of exports to conserve supplies of edible oil for domestic consumption were the principal factors responsible for reduced trade. Also limited shipping space in wartime precluded the movement of such bulk-type cargoes as cottonseed.

World trade in cottonseed oil is usually more widely distributed than that of seed although much smaller in volume. During 1935-39 imports of cottonseed oil into Canada and all European countries averaged only about 23,500 tons as compared with 63,800 tons during the predepression period. The United States became a large net importer of cottonseed oil in 1935 and accounted for about 66 percent of the world imports of 107,800 during the 4 years 1935-38.

TABLE 3.- *Cottonseed: Production in specified areas, averages 1930-34 and 1935-39, annual 1940-45*

CONTINENT AND COUNTRY	YEAR BEGINNING AUGUST 1							
	AVERAGE		1940	1941	1942	1943	1944[1]	1945[1]
	1930-34	1935-39						
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
North America:								
United States	5,784	5,554	5,286	4,553	5,202	4,688	4,902	3,634
Mexico	93	160	144	179	219	246	249	205
Haiti	15	12	7	6	7	7	6	7
Salvador	(2)	2	7	2	7	9	8	–
Estimated total[3]	5,895	5,735	5,455	4,750	5,440	4,955	5,170	3,860
South America:								
Brazil	369	935	1,198	881	1,038	1,291	753	932
Argentina	97	147	118	189	253	281	169	180
Peru	159	204	175	171	138	165	173	–
Paraguay	10	20	15	16	20	37	20	19
Colombia	7	12	10	12	11	13	7	14
Venezuela	6	6	7	7	9	9	9	10
Estimated total[3]	650	1,330	1,525	1,280	1,475	1,800	1,135	1,320
Asia and Australia:								
Soviet Union	843	1,640	1,434	–	–	–	–	–
India	2,192	2,591	2,840	2,861	2,196	2,456	1,654	1,618
Burma	36	54	51	36	39	50	47	16
China and Manchuria	1,523	1,593	1,314	1,343	–	–	815	926
Korea	71	91	85	93	98	104	116	83
Turkey	57	140	173	151	173	165	117	84
Iran	53	87	111	98	64	39	37	38
Afghanistan	–	[4] 27	21	24	12	11	–	–
Syria and Lebanon	5	16	16	12	7	9	7	–
Estimated total[3]	4,795	6,265	6,085	5,750	4,295	4,470	3,880	3,910
Africa:								
Egypt	787	1,007	1,011	923	467	394	512	580
Anglo-Egyptian Sudan	85	132	143	124	146	93	154	–
Uganda	105	143	157	101	48	80	116	111
Tanganyika	10	25	28	31	22	16	11	17
Belgian Congo	36	87	111	94	101	72	86	–
French Equatorial Africa	7	[4] 21	22	44	43	42	54	45
French West Africa	16	[4] 11	12	–	–	8	12	–
Mozambique	6	18	43	57	49	50	–	–
Nigeria	12	19	32	16	14	11	7	–
Estimated total[3]	1,080	1,490	1,585	1,430	930	790	1,030	1,085
Europe:								
Greece	12	33	39	22	–	6	17	18
Bulgaria	6	19	19	13	6	8	5	–
Italy	2	11	24	26	11	6	5	3
Spain	2	5	3	6	10	10	13	4
Rumania[5]	–	1	2	5	4	7	14	15
Estimated total[3]	25	75	90	80	40	40	60	55
Estimated world total	12,445	14,895	14,740	13,290	12,180	12,055	11,275	10,230

[1] Preliminary.
[2] Less than 500 tons.
[3] Includes estimates for countries listed above for which data are not available and for minor producing countries not shown.
[4] Average of less than 5 years.
[5] Figures for 1942 to date do not include estimates for areas ceded to neighboring countries in 1941.

Office of Foreign Agricultural Relations. United States figures were compiled from official records; figures for other countries were calculated from lint production estimates.

TABLE 4.- *Cottonseed: Imports and exports, by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Imports								
United Kingdom	633,200	687,300	–	–	–	–	11,200	46,900
Cont. Europe	50,600	18,900	2,100	–	–	–	–	–
Japan	70,700	80,900	45,600	23,400	19,400	3,600	–	–
Chile	8,300	44,000	40,400	8,600	6,100	(1)	200	–
Total	762,800	831,100	–	–	–	–	–	–
Exports:								
Egypt[2]	349,500	361,800	188,700	99,700	39,800	–	–	–
Egyptian Sudan	49,900	102,700	77,700	–	–	[3]69,700	–	–
British East Africa[4] . . .	51,500	111,100	46,700	3,000	24,500	–	–	–
British India	147,200	6,400	–	–	–	–	–	–
Soviet Union	–	8,900	–	–	–	–	–	–
Brazil	22,500	82,600	20,700	2,900	–	–	–	–
Peru	5,300	35,400	29,600	12,100	6,200	(1)	–	–
China	71,200	59,600	600	[5] 9,600	–	–	–	–
Manchuria	(6)	19,500	[6]3,100	–	–	–	–	–
Nigeria	6,500	12,600	12,500	500	6,300	5,600	1,300	–
Korea	3,200	9,300	–	–	–	–	–	–
Total	706,800	809,900	–	–	–	–	–	–

[1] Less than 100 tons.

[2] Shipments to the Sudan, mostly seed for planting, are not included.

[3] Exports to Egypt only.

[4] Kenya, Tanganyika, and Uganda.

[5] January to August only.

[6] Included with China until July 1, 1932.

Compiled from official and trade sources.

During the war years, world trade in this commodity decreased to less than one-half that of normal times. Exports from the United Kingdom and Japan disappeared after 1940 and from Egypt after 1942. The limited supplies available for export from the United States, Brazil, and Argentina during and since the war were allocated among the allied and neutral countries. (See table 5.)

TABLE 5. - *Cottonseed Oil:[1] Imports and exports by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Imports:								
United Kingdom	9,400	4,400	–	–	–	–	–	–
Europe	35,000	9.900	–	–	–	–	–	–
Japan	1,700	4,400	3,000	1,700	2,200	200	–	–
United States	[2] 700	65,500	6,500	12,700	4,500	6,600	5,200	16,800
Canada	19,700	9,200	11,800	20,400	5,500	9,400	17,700	12,300
Total	66,500	91,400	–	–	–	–	–	–
Exports:								
Egypt	11,300	12,700	10,300	7,100	4,000	(3)	(3)	400
United Kingdom	23,100	24,000	300	–	–	–	–	–
United States	24,900	3,200	7,100	6,600	10,000	24,600	2,600	5,200
Brazil	200	24,800	30,700	40,400	19,700	10,600	9,600	24,800
Argentina	–	100	1,300	7,800	8,200	22,100	15,900	[4]21,000
Peru	4,800	200	100	200	0	0	–	–
Mexico	300	1,400	0	1,300	1,000	–	–	–
China	–	10,800	900	–	–	–	–	–
Japan	300	11,000	–	–	–	–	–	–
Chosen	1,500	2,900	–	–	–	–	–	–
Soviet Union	5,500	1,900	–	–	–	–	–	–
Total	71,900	93,000	–	–	–	–	–	–

[1] Crude, refined and semirefined added without converting to common basis.

[2] Imports for consumption; refined and crude in terms of crude oil.

[3] Less than 100 tons.

[4] January-November Exports.

Compiled from official and trade sources.

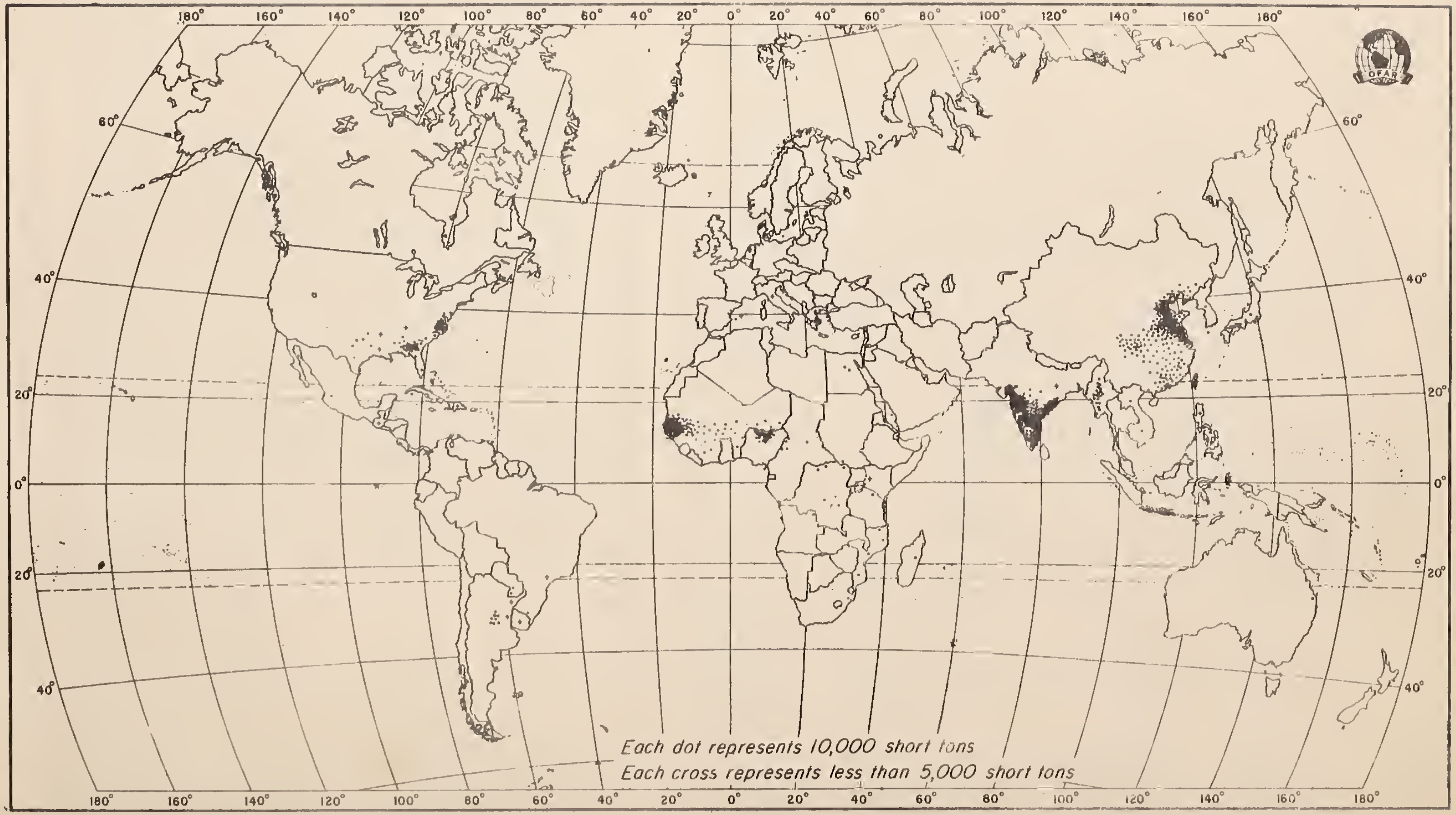

Each dot represents 10,000 short tons
Each cross represents less than 5,000 short tons
OFAR
180°
160°
140°
120°
100°
80°
60°
40°
20°
0°

FIGURE 2.-World peanut production, average 1935-39

PEANUTS AND OIL

SUMMARY

World production of peanuts in 1945 was estimated at 9.5 million short tons, a decrease of 6 percent from that of the previous year and 8 percent from the record crop of 10.4 million harvested in 1943. World production, however, was on a decidedly upward trend from 1909 to 1939, and, despite the decrease in the 1945 crop, it was above the 1930-39 average output. In order to alleviate the critical shortage of fats and oils during the war, most of the peanut-producing countries of the world endeavored to stimulate expansion of this crop. That these efforts met with much success is evidenced by the fact that world total production in 1943 and 1944 exceeded 10 million tons as compared with less than 9 million during the 10-year period 1930-39.

Peanuts are one of the major sources of edible oils and contribute about one-sixth of the world's supply of vegetable oils. In addition, large quantities are also consumed directly as food. They are extensively cultivated in practically all tropical and semitropical areas of the world and grow well even in the Temperate Zones. The principal producers, India, China, the United States, and West Africa, account for approximately 82 percent of world output. Asia alone supplies about 75 percent of the total. (See fig. 2.)

Production in French West Africa and Nigeria declined sharply when these areas were cut off from their continental-European markets. The past year, however, brought more nearly normal output.

Latin American production is relatively small, but it expanded materially during the war. Most of the increase has been required for domestic use, replacing copra that was formerly imported from the Pacific.

European output is limited; Italy, Spain, Bulgaria, and the Soviet Union are the only significant producers. The crushing industry, on the other hand, has been more important in Europe than any place else in the world.

Almost a third of the 1930-39 output entered world trade as nuts and oil. India, French West Africa, British West Africa, and China were the principal exporters, and European countries were the leading importers.

OUTLOOK

In view of the fact that fats and oils, at the present time, continue in short supply; and, since peanuts and peanut oil have become increasingly popular as edible products, it is not likely that world production will be reduced greatly in the immediate future. Present indications are that larger quantities will be consumed in the major producing,normal prewar exporting countries as a result of the difficulties of obtaining other food products from former supplying areas. On the other hand, with the return of coconut, palm, and possibly soybean oils in prewar volume from the Far East, world prices of peanuts, as well as those of other fats and oils, likely will decline, and decreased production will result. The future competitive position of peanut oil will depend largely on the extent to which the cost of production can be kept down. Lower prices may be at least partially offset by the wider use of machinery and by increased yields per acre resulting from improved varieties and improved cultural practices.

TABLE 6. - Peanuts:[1] Acreage and production in specified areas, year of harvest, averages 1930-34 and 1935-39, annual 1943-45

CONTINENT & COUNTRY	ACREAGE[2]					PRODUCTION				
	AVERAGE					AVERAGE				
	1930-34	1935-39	1943	1944	1945[3]	1930-34	1935-39	1943	1944	1945[3]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
North America:										
United States	1,349	1,559	3,595	3,150	3,183	452.8	614.6	1,092.4	1,055.4	1,039.8
Mexico	17	33	-	-	-	5.9	12.2	85.0	55.0	50.0
Cuba	-	-	133	57	118	-	[4] 8.4	35.0	25.0	23.5
Dominican Republic	-	-	31	30	-	-	[4] 3.8	8.4	4.9	12.8
Guatemala	(5)	1	-	-	-	.1	.3	.8	.8	-
Estimated total[6]	1,400	1,800	3,900	3,400	3,500	459.0	639.5	1,222.8	1,141.1	1,127.1
Europe:										
Italy	-	[4] 2	-	-	-	-	[4] 1.6	-	3.9	4.9
Spain	21	[7] 24	-	-	-	24.0	[7] 23.3	-	-	-
Estimated total[6]	30	65	80	75	80	25.1	41.3	42.5	40.5	42.0
Asia:										
India	5,142	7,635	9,808	9,841	9,848	2,803.4	3,295.7	4,281.8	4,318.7	3,486.5
Burma	552	784	-	-	590	153.5	192.2	-	-	106.4
China	[4] 3,700	[4] 3,393	[8] 1,710	[8] 1,763	[8] 1,734	[4] 3,100.2	[4] 2,589.4	[8] 1,178.6	[8] 1,200.2	[8] 1,218.4
Manchuria	-	-	-	-	-	[4] [9] 89.5	[4] [9] 121.6	-	-	-
Kwantung	87	[4] 101	-	-	-	77.4	[4] 91.1	-	-	-
Formosa	71	[4] 77	-	-	-	51.4	[4] 61.1	-	-	-
Korea	4	[4] 7	-	-	-	3.2	[4] 7.6	-	-	-
Indochina	35	[4] 42	-	-	-	14.1	[4] 16.0	-	-	-
Netherlands Indies[10]	523	572	-	-	-	257.9	289.1	-	-	-
French India	8	[4] 7	-	-	-	2.8	[4] 6.5	-	-	-
Philippine Islands	18	18	-	-	-	4.5	4.7	-	-	19.8
Japan	16	[4] 19	-	-	-	13.0	14.5	-	-	-
Estimated total[6]	11,400	13,000	15,000	15,000	15,000	6,599.5	6,818.5	7,745.0	7,805.1	6,898.4
Africa										
French West	2,392	[4] 2,955	-	-	-	734.4	[4] 875.9	500.0	275.6	601.2
Cameroon (French)	160	[4] 290	-	-	-	26.1	[4] 40.1	-	-	-
French Equatorial	41	[4] 98	-	-	-	12.7	[7] 18.7	-	-	-
Madagascar	13	14	19	27	31	6.0	6.5	6.6	7.7	8.8
Anglo-Egyptian Sudan	27	43	58	55	-	6.1	8.1	11.3	11.5	-
Egypt	24	23	26	27	24	17.2	17.2	18.5	22.0	20.7
Nigeria	-	-	-	-	-	[9] 317.1	[9] 354.7	364.0	305.8	308.0
Gambia	-	-	-	-	-	[9] 71.3	[9] 58.1	-	-	-
Union of South Africa[11]	40	56	-	-	-	7.9	12.0	-	-	-
Kenya and Uganda	116	153	-	-	-	[9] 1.4	[9] 2.2	-	-	-
Tanganyika	118	[4] 277	-	-	-	[9] 21.3	[9] 23.4	[9] 3.2	3.5	5.2
Belgian Congo	259	[7] 245	-	-	-	[9] 100.5	[7] 65.[illegible]	-	-	-
Mozambique	-	-	-	-	-	[9] 40.6	[9] 42.9	[9] 13.2	[9] 12.5	-
Angola	[4] 55	18	-	-	-	[4] 17.6	6.2	-	-	-
Portuguese Guinea	-	-	-	-	-	[9] 26.5	[9] 28.0	[9] 38.9	[9] 22.2	-
Estimated total[6]	4,990	6,120	5,000	4,000	4,000	1,488.0	1,652.5	1,191.0	907.0	1,243.5
South America:										
Argentina	[12] 160	[4] 207	269	359	351	82.2	87.3	105.9	219.2	174.4
Brazil	-	-	-	-	-	-	[7] 14.8	27.5	37.5	27.6
Paraguay	10	[4] 29	38	-	-	9.3	[4] 19.4	10.4	4.4	4.8
Uruguay	2	5	17	12	20	.5	1.2	2.0	3.9	4.7
Estimated total[6]	175	400	500	600	500	93.0	128.5	154.0	274.0	220.2
Oceania:										
Australia	4	[4] 14	15	16	17	2.2	[4] 6.1	7.2	8.7	9.0
Estimated total[6]	5	15	20	25	20	2.5	6.5	7.5	9.0	9.5
Estimated world total	18,000	21,400	24,500	23,100	23,100	8,670.1	9,285.8	10,362.8	10,176.8	9,540.7

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[1] Peanuts in the shell. Southern hemisphere peanut crops, which are harvested from April to June, are combined with those of the Northern Hemisphere harvested from September through December of the same year.

[2] Figures refer to harvested areas as far as possible.

[3] Preliminary.

[4] Average of less than 5 years.

[5] Less than 500 acres.

[6] Includes estimates for countries listed above for which data are not available and for minor producing countries.

[7] One year only.

[8] Free China.

[9] Export figures.

[10] Java and Madura.

[11] European farms only.

[12] Sown area.

Compiled from official sources and includes Office of Foreign Agricultural Relations estimates based on foreign-service reports and other information.

ORIGIN AND USES

Peanuts, known also as arachis nuts, earth nuts, groundnuts, goobers, pinders, and by other names in different localities, are the seeds of an annual plant belonging to the family Leguminosae, of which the species ***Arachis hypogaea*** is the most widespread. According to the most generally accepted opinion, the place of origin was Brazil, although evidence indicates that the peanut was also a prehistoric product of Peru. From South America the nuts were carried to Africa by slave ship and by the same means from Africa to North America. Culture is successful only in reasonably warm climates, and the plants thrive best in light, sandy soils well-provided with plant foods, in regions where the rainfall during the growing season does not exceed 26 inches.

In general, there is little difference between the varieties used for oil and those used for other edible purposes, although in the second case the types yielding very large kernels are preferred. In the past, peanut oil was obtained principally from nuts grown in India and Africa and exported to Europe for crushing. The quantity of peanuts crushed for oil in the United States varies from about 15 to 20 percent of production, depending upoh the amount of subsidy paid to crushers and the demand for nuts for other purposes, such as peanut butter; peanut candy; shelled, salted peanuts; and peanuts roasted in the shell.

The oil content of peanuts is variable, but whole nuts crushed generally yield from 28 to 30 percent oil and shelled nuts from 36 to 45 percent. Peanuts also have a high protein content, varying from 20 to 30 percent for shelled nuts. The yield of oil per acre is relatively large as compared with that of most other annual oilseed crops.

Peanut oil is used for the same purposes, and, with few exceptions, it may be considered interchangeable with cottonseed oil. It is also readily replacing other oils that are scarce or almost unobtainable. In the United States, it is used chiefly in the manufacture of vegetable margarines; some is used as salad oil and cooking oil and, at times, in the manufacture of vegetable shortening and in making soap. For innumerable other industrial, pharmaceutical, and medicinal uses, peanuts, as well as all their byproducts, are highly valuable.

PRODUCTION BY REGIONS

Asia

Asia supplies about three-fourths of the world's peanut output. Though India, China, and the Netherlands Indies are by far the principal producing countries, sizable amounts also are grown in Burma, Manchuria, and Formosa, and smaller quantities in all other Asiatic countries. (See table 6.)

India, the world's largest producer, with an average annual output of more than 3.7 million tons, normally accounts for about a third of the world total. Peanuts are grown predominately in the southern Provinces; Madras has about 40 and Bombay 24 percent of the total acreage. Despite the fact that the 1945 acreage was the largest on record, the output of 3.5 million tons was smaller than that of several previous years as a result of adverse weather conditions. This decrease and the urgent demand for peanuts for home consumption brought about reduced exports in 1945. The nuts form an important part of the Indian diet and roughly 40 to 50 percent of the oil is consumed in the producing area. In addition, approximately a third of the output has, in the past, been exported in the form of nuts and oil. During the war and continuing to the present time, all oilseed purchases were made by the British Ministry of Food. On February 27, 1946, however, all exports of peanuts were prohibited. Shipments to prewar European markets, such as France, Belgium, and Italy, may not be revived for some time to come.

As a result of the cutting off of copra supplies from the Netherlands Indies and the pressure of war demands, the crushing of peanuts in India was considerably expanded during the war, and new factories for the production of vegetable-oil shortening are planned. This has somewhat modified the overwhelming dependence of peanut growers on exports and may further limit the volume of India's exports in the future. Southern India expects a postwar expansion in its entire vegetable-oilseed-crushing industry, particularly in the extraction of oil from peanuts. Numerous handicaps, however, must first be overcome. There are now between 500 and 800 expelling plants in southern India, each of which annually absorbs an average of about 1,100 tons of peanuts. They produce between 250,000 and 390,000 tons of oil and over 440,000 tons of cake. During the past 5 years the crushing industry is believed to have at least doubled its capacity, and the trade is convinced that the current capacity will again be doubled within 3 to 5 years.

China, the world's second largest producing country, had an average annual crop of approximately 3 million tons from 1930 to 1939. Recent figures for all China are not available; the major producing areas, of which Shantung is most important, are concentrated in territory formerly occupied by the Japanese. Production in the 15 Provinces of Free China has, for the past 5 years, averaged 1.2 million tons annually. In addition, Manchuria produces sizable amounts as evidenced by exports averaging over 100,000 tons a year during the 1930's.

Peanuts are grown for local consumption by the farmers and as a cash crop. Exports from China during 1925-34 averaged about 236,000 tons but dropped to 129,000 during the following 5 years (1935-39). Shipments were largely to European markets, particularly Great Britain, France, Germany, and the Netherlands. Shipments of oil maintained a level of approximately 35,000 tons from 1925 to 1940, the United States receiving more than any other single country.

The Netherlands Indies ranks third among the Asiatic peanut-producing countries. Figures are available for only the Provinces of Java and Madura, which produced an annual average of about 274,000 tons during 1930-39. The output since 1939 probably has maintained about the same level, since this is an important export crop. An average of 27,000 tons of nuts were shipped annually from 1930 to 1939, of which large quantities went to the Straits Settlements, Singapore, and European countries, particularly the Netherlands and the United Kingdom. During the same period exports of oil averaged about 7,000 tons annually, which went principally to Singapore and Hong Kong.

Africa

African peanut production during the past 3 years has accounted for about 11 percent of total world output, whereas in prewar years it averaged 18 percent. During the early years of World War II, production declined sharply as a result of the shortage of transportation facilities, the lack of incentive goods, and severe droughts. The 1945 crop, however, was the largest since 1940. In view of the continued export demand for peanuts, as well as the importance of this crop within the continent, production in Africa is expected to maintain at least a normal level in 1946.

French West Africa, Senegal in particular, is the leading producer. The output of peanuts, the principal crop, is governed largely by the export demand and by the available supply of other foods. Peanuts are an important item in the native diet; however, consumption is also governed by the availability of other locally produced food products and the prices of imported food. The Department of Agriculture of French West Africa adopted measures to increase 1945 production in order to contribute a larger share to liberated France. Oil output, on the other hand, was curtailed because of an insufficient stock of items necessary to the industry. Normally, this area produces over 800,000 tons of nuts and exports approximately 570,000, chiefly to France. Shipments have been reduced to less than 200,000 tons the past few years.

Nigeria ranks second in African peanut production. Output in 1945 was slightly larger than in the previous year. Exports, unshelled, amounting to over 300,000 tons in prewar years, have dropped to slightly over 200,000. The United Kingdom has been the principal recipient.

Limited information for other African countries shows increases over the 1944 output in Madagascar and Tanganyika but a decrease of 6 percent in Egypt. In 1945, for the first time, Egypt crushed a small quantity of peanuts for oil. Exports from these three and other less important producing countries also decreased during the war years.

North America

North America, as a continent, ranks third in peanut production. All the major producing areas have greatly expanded their output in the past decade. The 1945 harvest of 1.1 million tons represents an increase of more than 100 percent over the 1930-39 average.

The United States, the largest producer on this continent, harvested in 1945 the smallest crop since 1941, but the 1945 production was 41 percent above the average for the 10-year period 1934-43. Increased acreage in the past season was more than offset by reduced yields per acre caused by unfavorable weather conditions in some areas.

Peanuts are an important farm crop throughout the greater part of the Southern States. The soil and climate conditions of southeastern Virginia and northeastern North Carolina are especially well adapted to the growing of the Jumbo, Virginia Bunch, and Virginia Runner varieties, which constitute the bulk of the large-podded peanuts appearing on United States markets. Throughout the Gulf-coast region, Oklahoma, and Arkansas, the Spanish variety, which is used mainly for shelling and for the manufacture of peanut oil, has proved satisfactory, but peanuts of the Runner type are grown extensively in Alabama and Florida.

In contrast to most other crops, peanut production and marketing in the United States increased between 1930 and 1940. No other cash crop, with the exception of soybeans, underwent a greater expansion during the period between World Wars I and II. Peanut acreage since 1941 has been increased more than 90 percent over the 1935-39 average. High support prices paid to growers under a Government-sponsored and Government-subsidized program were a strong inducement toward expanding the output of this crop. Most of the wartime increase in peanut production, however, was used to meet the strong demand for edible-peanut production rather than for crushing. Crushing capacity for the production of oil in the United States far exceeds requirements, since the mills which crush cottonseed can also be used to crush peanuts.

Imports of peanuts into the United States averaged 2,500 tons during 1930-39 and continued small until 1945, when Argentine peanuts, brought in for crushing, raised the import figure to 37,700. For the same period exports increased from 800 to 17,900 tons. Peanut-oil trade has never been significant.

The prospective acreage for 1946 of peanuts grown alone for all purposes in the United States totals 3.9 million acres, about 2 percent less than that of last year and 24 percent below the record planting in 1943 but 32 percent above the 10-year average 1935-44. Despite a reduction in acreage goals for 1946, the latest estimate indicates that at least 3 million acres will be harvested for nuts and that the output probably will about equal that of 1945, as a result of the attractive support prices paid by the Government. Labor shortage of the war years is being alleviated by the return of war veterans, as well as by the increased and improved supply of machinery which demands less manpower. The present shortage of foods high in protein and fat content is expected to continue for some time, and consumption of all substitutes, peanuts in particular, will probably continue to be as high as during the war years.

Mexican peanut production for 1945 was estimated at approximately 50,000 short tons, a decrease of about 9 percent from the output of 1944 and 42 percent from the record crop of 1943 but an increase of more than 450 percent over the 10-year average 1930-39. This sharp upward trend was the result of efforts, principally in the form of attractive prices to producers, to stimulate domestic sources of vegetable oils to compensate for the loss of copra imports from the Pacific. Smaller production in the past 2 years may be attributed chiefly to the fact that larger imports of lard resulted in reduced peanut prices.

Though peanuts are grown in nearly all parts of Mexico, the most important growing section is the area around Guadalajara, Jalisco. Previous to 1930 the peanut crop was consumed almost entirely in the form of nuts rather than as oil. Since then oil output has taken an upward trend. The quantity of peanuts consumed for edible purposes seems to vary with price trends; larger amounts are sold for crushing when prices are high.

Peanut oil is becoming increasingly popular in Mexico, especially among soap manufacturers, because of the scarcity of copra. It is also in great demand for edible purposes, particularly since many producers give preference to this oil for making vegetable shortening. Apparent annual supply of peanut oil in 1945 amounted to almost 10,000 tons as compared with about 18,000 tons a year earlier.

Import and export trade in peanuts and oil have been insignificant in past years, except for the exportation of about 4,000 tons of shelled peanuts (6,000 in the shell) in 1943 and 5,000 tons (7,000 in the shell) in 1945.

Peanut prospects for 1946 are still uncertain. Prices of all vegetable oilseeds and oils are expected to decline as soon as sizable quantities of copra can be imported. Such a decline would reduce the acreage of peanuts, as well as that of other oilseeds.

Cuba produced approximately 24,000 tons of peanuts in 1945, a decrease of 6 percent from the harvest of a year earlier and 11 percent from the preceding 5-year average output. A considerable amount of seed failed to germinate because of the severe drought in the spring and early summer, and extensive replanting was necessary. Peanut production has expanded decidedly in recent years, the 1945 harvest being approximately 8 times that of 1937. The Government has sponsored a program, in the form of seed distribution and guaranteed minimum prices to growers, for the purpose of increasing the output of peanut oil. As a result, oil production increased from about 650 tons in 1937 to 8,500 in 1943 and then dropped to about 5,000 in 1945.

There are six large and several smaller peanut crushers in Cuba. Normally two crops of nuts are produced, and, since the fall crop is not harvested until December, crushing is not completed until March of the following year. From 85 to 90 percent of the total output is crushed for oil, which is consumed principally as a substitute for olive oil. Cuban trade in both nuts and oil is negligible.

The general belief is that 1946 plantings are about the same as in 1945. The Cuban Government, however, has increased the price to growers, from $4.50 to $5.50 a Spanish quintal ($4.44 to $5.42 per 100 pounds), in order to stimulate this year's production. Crushers have requested that the ceiling price of oil be increased by almost 5 cents a pound to defray the increased cost. The present retail ceiling is 30 cents. If weather conditions are favorable, peanut production may reach a quantity sufficient to produce from 6,000 to 8,000 tons of oil.

The Dominican Republic produced the largest peanut crop on record in 1945. The 13,000-ton output was 178 percent greater than that of 1944 and 129 percent greater than the average of 1940-44. The Government of this country also enacted legislation to encourage the production of this crop with a view toward establishing peanut oil and peanut cake in its export trade. The *Sociedad Industrial Dominicana* (Dominican Industrial Association), which operates a peanut-oil factory in Ciudad Trujillo, is the sole producer of edible oils in the Republic. The management of the factory, by every possible means, has encouraged the independent farmers to cultivate peanuts in preference to other crops. It has advanced money, provided all seed, and guaranteed to purchase the peanuts and transport them from the point of production direct to the factory. Although the original intention was that the plant should supply the entire demand of the country for edible oils, peanut production has not yet reached the point of providing even one-half the amount necessary to satisfy domestic needs.

Peanut oil is used as a lard substitute in the Dominican Republic, and, when domestic production of this oil is sufficient in quantity, the importation of lard will no longer be necessary.

The 1946 peanut crop may be even larger than that of 1945, since the Government continues to stimulate efforts to make the Republic self-sufficient in edible oils.

South America

South America produced approximately 220,000 tons of peanuts in 1945. This is a decrease of almost 20 percent from the 1944 harvest but an increase of 35 percent over the 5-year average 1940-44.

Argentina, the largest Latin American producer, harvested 174,000 tons in 1945, a decrease of 20 percent from that of 1944 but an increase of more than 50 percent over the average for the preceding 5 years. The harvested acreage, which was the second largest ever reported, nevertheless indicated a greater loss than usual from the planted area because of the lack of rain during the growing period. Over 90 percent of the crop was grown in the Province of Córdoba.

Argentine peanut production increased gradually during the war years, despite the fact that the Government had no program of aid for this crop. Prices maintained a high level as a result of the strong foreign and domestic demand for both nuts and oil. Exports of peanuts increased from the 1935-39 annual average of 3,700 tons to an 11-month total, January-November 1945, of 54,800. Oil exports rose from 33 tons (1935-39 average) to about 4,000 for 1945.

Argentine plantings (November-December) for the 1946 crop were the largest on record, and, according to the first official estimate of 176,000 tons, the harvest may compare favorably with the crops of recent years.

Brazilian peanut production is small, having amounted in 1945 to only 28,000 tons, a decrease of 26 percent from that of a year earlier but an increase of 18 percent over the 1939-43 average. The bulk of the output is grown in the State of São Paulo, where two crops are produced annually. Frequently, peanuts are planted in alternate rows with other crops, such as cotton, corn, castor-beans, beans, and sometimes coffee.

Peanut oil is manufactured in sizable quantities, almost all of it being processed in São Paulo. The largest amount ever recorded, about 6,700 tons, was produced in 1943. The oil is consumed within the country, principally as a substitute for olive oil. Exports of nuts have been insignificant; the largest quantity on record was 1,070 tons shipped in 1940. Little effort has been made in the past to develop an export market, since wholesale prices for peanuts on the domestic market have usually been in excess of those paid by exporters. A substantial increase in the production of peanuts is expected in 1946, and more will be available for processing.

Paraguay and Uruguay produced larger crops of peanuts in 1945 than in 1944. Two crops are grown each year in Paraguay, and a large quantity, mixed with corn in some sections, is consumed as food. Peanut oil has become increasingly popular in recent years and is gradually replacing cottonseed oil for edible purposes. Small quantities of peanuts are exported, but the oil is consumed within the country.

Uruguay's outturn of peanuts in 1945 was the largest in the country's history, but production is generally on a small scale. The principal producing areas are in the three northerly Departments of Salto, Rivera, and Tacuarembó. Increased output has been stimulated by high prices, but the demands of the country continue to make imports necessary. Though the crushing industry has been in existence for some time, it did not attain importance until 1936 and 1937. Peanut oil is consumed in the country as a substitute for, or mixed with, olive oil.

Europe

Peanut production is of minor importance in European countries. The estimated total for the entire continent amounted to only 4 000 tons in 1945. Spain, the largest producer, accounted for over half the total output during 1935-39. Italy, Bulgaria, and the Soviet Union produced small quantities. Europe, however, ranks first among the continents in the peanut-crushing industry. Large quantities of nuts are imported for processing to secure the oil, which ranks in consumption second only to olive oil in continental Europe, and the cake, which is in great demand as livestock feed.

INTERNATIONAL TRADE

Prior to World War II, about 30 percent of world peanut production entered export-trade channels as nuts. Relatively small quantities of peanut oil were exported from producing countries; however, a number of European countries exported the oil processed from imported nuts. The war brought about decided changes in the trade. Exporters whose markets were not entirely cut off were forced to seek new trade outlets and, in most cases, to curtail the quantity shipped in order to meet increased domestic needs. Importing countries attempted to fulfill their requirements from any sources available, or to become self-sufficient in peanut and/or other oilseed production.

In many cases purchases were controlled and allocated by agencies set up under emergency war measures. Thus, available trade statistics since 1940 do not present an accurate picture of normal trade conditions. Even statistics for prewar years are complicated by the fact that the trade figures of numerous countries fail to indicate whether the nuts shipped were shelled or unshelled.

With the exception of the United States, the principal peanut-producing countries are the leading exporters. India has generally ranked first and French West Africa second. During the decade prior to World War II, these two areas exported approximately 60 percent of total world exports. Nigeria and then China follow in importance in spite of the fact that China's shipments were drastically curtailed in the late 1930's, when trade in most other countries was still unaffected by war conditions. World exports during the 1930's averaged over 2.5 million tons. (See table 7.)

European countries received 94 percent of total world peanut imports from 1930 to 1939, despite the fact that a great reduction from earlier years was brought about in the early 1930's by the world economic crisis. (See table 8.) France, the leading world importer, accounted for over 40 percent of the world total, with Germany, the United Kingdom, and the Netherlands following in the order named. Though imports into most European countries declined during the war, those to the United Kingdom increased from the 1930-39 average of about 290,000 tons to the high of 1,059,000 in 1941 and to 718,000 in 1945.

European countries also ranked first in peanut-oil exports for the same period, accounting for 66 percent of world total. (See table 9.) Of the six principal European exporters - France, the Netherlands, the United Kingdom, Denmark, Germany, and

TABLE 7.--*Peanuts:*[1] *World exports, averages 1930-34 and 1935-39, annual 1940-45*[2]

CONTINENT AND COUNTRY	AVERAGE 1930-34	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
North America and Central America:								
United States	1.4	0.2	0.4	3.0	0.7	4.7	11.4	17.9
Mexico	(3)	(3)	(3)	(3)	.6	6.2	1.1	7.4
Other countries	.1	(3)	.1	.1	(3)	–	–	–
Total	1.5	.2	–	–	–	–	–	–
Total Europe	4.5	5.9	[4]3.4	[4].4	[4].1	–	–	–
Asia:								
India	968.1	1,044.8	[4]568.8	[4]663.6	[4]267.4	383.7	421.2	[4]218.8
China	267.3	128.8	86.5	72.2	–	–	–	–
Manchuria	[5]89.6	121.6	[4]24.8	–	–	–	–	–
Netherlands Indies	22.9	31.4	15.5	–	–	–	–	–
French India	74.5	[5]114.0	–	–	–	–	–	–
British Malaya	1.4	1.1	–	–	–	–	–	–
Indochina	.1	2.4	–	–	–	–	–	–
Philippine Islands	.2	1.3	2.5	–	–	–	–	–
Other countries	11.2	27.4	1.4	–	–	–	–	–
Total	1,435.3	1,472.8	–	–	–	–	–	–
Africa:								
French West	467.8	[5]675.9	–	569.8	134.7	19.3	193.5	[4]156.8
Nigeria	317.1	354.7	284.7	415.3	326.2	239.4	259.0	–
Gambia	71.3	58.1	48.9	–	–	–	–	–
Mozambique	40.6	42.9	21.5	13.1	10.8	13.2	12.5	–
Portuguese Guinea	26.5	28.0	32.3	38.2	21.3	38.9	22.2	[4]19.5
Tanganyika	21.3	23.4	–	19.0	22.2	3.2	1.5	.7
Anglo-Egyptian Sudan . . .	4.3	5.6	8.9	[4]3.8	–	–	–	–
French Cameroon	2.6	11.2	–	–	–	–	–	–
Egypt	.6	.6	2.7	1.7	.1	0	(3)	(3)
Union of South Africa . . .	.2	.5	1.4	.4	–	–	–	–
Kenya and Uganda	1.4	2.2	.2	4.6	9.1	–	–	–
Other countries	2.0	13.9	.5	2.5	1.8	1.8	4.9	5.4
Total	955.7	1,217.0	–	–	–	–	–	–
South America:								
Argentina	.2	3.7	18.5	9.7	26.9	24.9	64.3	[4]54.8
Other countries	.2	.2	1.1	(3)	(3)	.2	.2	.1
Total	.4	3.9	–	–	–	–	–	–
World total	2,397.4	2,699.8	–	–	–	–	–	–

[1] Peanuts in the shell.
[2] 1940-45 subject to revision.
[3] Less than 50 tons.
[4] Incomplete.
[5] Average of less than 5 years.

Compiled from official sources.

TABLE 8.- *Peanuts:*[1] *World imports, averages 1930-34 and 1935-39, annual 1940-45*[2]

CONTINENT & COUNTRY	AVERAGE 1930-34	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
North America and Central America:								
United States	2.6	2.4	3.6	2.3	0	2.6	6.9	37.7
Canada	14.9	18.4	23.3	26.0	8.3	10.6	40.7	33.7
Other countries	.6	.3	(3)	(3)	.9	(3)	(3)	–
Total	18.1	21.1	–	–	–	–	–	–
Europe:								
France	1,019.7	1,111.1	619.8	554.9	131.3	–	–	–
Germany	684.6	453.4	31.3	9.5	4.3	0	–	–
United Kingdom	184.8	394.5	713.6	1,059.1	790.8	692.9	1,013.5	717.7
Italy	114.3	121.9	3.4	–	–	–	–	–
Netherlands	132.7	252.9	–	–	–	–	–	–
Belgium	31.8	99.7	–	–	–	–	–	3.3
Denmark	35.9	49.4	19.8	–	–	–	–	–
Sweden	4.4	3.3	1.8	(3)	12.6	–	–	–
Poland	3.2	[4] .4	–	–	–	–	–	–
Czechoslovakia	[4] 37.0	[4] 45.1	–	–	–	–	–	–
Greece	.7	[4] .4	–	–	–	–	–	–
Yugoslavia	6.3	.1	–	–	–	–	–	–
Finland	2.2	.6	0	–	–	–	–	–
Portugal	–	25.0	45.4	46.9	23.5	43.6	23.8	[5] 35.9
Norway	17.2	13.4	6.5	0	0	0	–	–
Other countries	.4	7.2	–	–	–	–	–	–
Total	2,275.2	2,578.4	–	–	–	–	–	–
Asia:								
British Malaya	12.0	16.0	–	–	–	–	–	–
Japan	18.2	22.1	25.0	12.1	28.8	20.9	4.0	2.9
Philippine Islands	1.9	1.3	.5	–	–	–	–	–
China	1.9	.2	3.1	[5] .5	–	–	–	–
Palestine	6.2	22.7	25.4	11.5	25.2	14.3	–	–
Indochina	1.0	.2	–	–	–	–	–	–
Hong Kong	22.6	44.2	–	–	–	–	–	–
Syria and Lebanon	.8	1.4	–	–	–	–	–	–
Burma	(6)	10.9	[5] 4.0	–	–	–	–	–
Ceylon	.6	.7	1.4	1.8	–	–	–	–
Other countries	2.0	.8	.1	.7	2.2	–	–	–
Total	67.2	120.5	–	–	–	–	–	–
Africa:								
Algeria	8.0	[4] 8.7	–	–	–	–	–	–
Egypt	3.4	5.1	7.4	4.1	2.5	(3)	8.2	(3)
Tunisia	2.7	[4] 3.2	–	–	–	–	–	–
Union of South Africa	5.1	21.9	33.1	50.3	–	–	–	–
Kenya and Uganda	.3	.6	1.3	1.2	.2	1.6	.4	.3
French Morocco	3.3	3.4	.2	1.4	2.7	–	–	–
Other countries	3.0	1.9	–	.5	.2	–	–	–
Total	25.8	44.8	–	–	–	–	–	–
South America:								
Chile	.2	1.3	18.9	19.5	5.0	.4	3.9	[5] 4.4
Uruguay	.3	11.3	11.6	–	–	–	1.8	[5] .1
Other countries	2.2	.1	.2	(3)	2.3	(3)	–	–
Total	2.7	12.7	–	–	–	–	–	–
Oceania:								
Australia	.8	1.7	–	–	–	–	–	–
New Zealand	[7] 1.0	1.1	–	–	–	–	–	–
Other countries	(3)	(3)	–	–	–	–	–	–
Total	1.8	2.8	–	–	–	–	–	–
World total	2,390.8	2,780.3	–	–	–	–	–	–

[1] Peanuts in the shell.

[2] 1940-45 subject to revision.

[3] Less than 50 tons.

[4] Average of less than 5 years.

[5] Incomplete.

[6] Included with India.

[7] 1934 only.

Compiled from official sources.

TABLE 9.- *Peanut Oil:*[1] *World exports, averages 1930-34 and 1935-39, annual 1940-45*[2]

CONTINENT AND COUNTRY	AVERAGE 1930-34	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
North America and Central America:								
United States	(3)	[4] 173	1,518	4,616	364	396	104	218
Other countries	8	3	57	213	14	–	–	–
Total	8	176	–	–	–	–	–	–
Europe:								
Belgium-Luxemburg	1,304	2,363	–	–	–	–	–	–
United Kingdom	3,335	24,168	807	45	0	3	0	3,067
France	45,882	51,519	15,792	25,643	11,004	–	–	–
Netherlands	22,103	43,902	–	–	–	–	–	–
Norway	181	273	0	0	0	0	–	–
Denmark	6,795	10,062	40	1	–	–	–	–
Sweden	384	996	18	1	–	–	–	–
Czechoslovakia	196	–	–	–	–	–	–	–
Germany	22,609	1,318	10	301	28	0	–	–
Italy	40	154	2	–	–	[5] 1	–	–
Portugal	(3)	(3)	(3)	1,842	18	65	97	–
Other countries	23	1	–	–	–	–	–	–
Total	102,852	134,756	–	–	–	–	–	–
Asia:								
China	[6] 34,634	[6] 36,079	27,062	[5] 11,536	–	–	–	–
Manchuria	125	592	–	–	–	–	–	–
Netherlands Indies	4,053	10,130	10,704	–	–	–	–	–
British Malaya	1,352	1,341	–	–	–	–	–	–
India	2,258	8,596	[5] 39,195	[5] 28,876	[5] 8,430	1,308	776	[5] 321
Indochina	2	199	–	–	–	–	–	–
Other countries	8,804	10,405	–	–	–	–	–	–
Total	51,228	67,342	–	–	–	–	–	–
Africa:								
Mozambique	951	36	2	533	98	561	519	–
French West Africa	1,429	[6] 1,339	–	–	–	–	–	–
Algeria	416	[6] 79	–	–	–	–	–	–
Kenya and Uganda	[6] 24	25	106	39	58	–	–	–
Tanganyika	16	40	–	18	10	115	23	0
Other countries	30	62	–	–	44	9	8	–
Total	2,866	1,581	–	–	–	–	–	–
South America:								
Argentina	1	33	426	7,038	8,708	1,470	620	[5] 3,717
Other countries	–	–	–	–	–	–	–	–
Total	1	33	–	–	–	–	–	–
World total	156,955	203,888	–	–	–	–	–	–

[1] Crude and refined in terms of crude.
[2] 1940-45 subject to revision.
[3] Not separately classified.
[4] 1939 only.
[5] Incomplete.
[6] Average of less than 5 years.
Compiled from official sources.

Belgium - France has, since before World War I, occupied first place. From 1935 to 1939, this country shipped an average of about 52,000 tons, principally to African colonial possessions. Among the principal producing countries, China is one of the few Asiatic countries exporting sizable quantities of peanut oil in addition to peanuts.

In the early 1930's, the European countries were the greatest importers of peanut oil, followed by Africa, Asia, and North America in the order named. (See table 10.) However, from 1935 through 1939 European imports were reduced, and those of the other continents increased so that the order became North America, Africa, Asia, and Europe. Of the European countries, the United Kingdom imported the largest quantity of peanut oil in the 10-year period 1930-39, an average of nearly 10,000 tons annually. This originated largely in other European countries, the Netherlands in particular. Belgium-Luxemburg imported on an average over 8,000 annually during the same period, the bulk of which also came from the Netherlands. Total world imports of peanut oil from 1935 to 1939 averaged over 190,000 tons a year.

TABLE 10.- *Peanut Oil*[1] *World Imports, averages 1930-34 and 1935-39, annual 1940-45*[2]

CONTINENT AND COUNTRY	AVERAGE 1930-34	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
North America and Central America:								
United States	1,203	22,028	1,659	2,574	234	5	(3)	0
Canada	19,798	[4] 34,988	17,268	12,001	7,547	987	60	48
Guadaloupe	1,265	[4] 962	–	–	–	–	–	–
Martinique	2,116	[4] 1,543	–	–	–	–	–	–
Other countries	12	19	–	–	–	–	–	–
Total	24,394	59,540	–	–	–	–	–	–
Europe:								
Belgium-Luxemburg	9,199	6,972	–	–	–	–	–	5,704
Czechoslovakia	3,398	[4] 1,865	–	–	–	–	–	–
France	5,210	1,438	179	243	146	–	–	–
Netherlands	4,758	1,518	–	–	–	–	–	–
Italy	348	445	(3)	40	(3)	[5] 1	–	–
Sweden	3,567	51	10	386	497	14	–	–
Finland	692	714	16	–	–	–	–	–
Norway	1,179	672	112	66	0	0	–	–
Denmark	603	70	39	220	27	–	–	–
United Kingdom	12,848	6,289	824	446	97	1	7	0
Germany	965	6,676	736	17,031	17,414	1,377	–	–
Switzerland	[4] 5,938	7,567	2,950	8,355	6,620	2,447	313	–
Portugal	[4] 1,243	1,920	21	–	1	–	10	–
Other countries	364	772	–	–	–	–	–	–
Total	50,312	36,969	–	–	–	–	–	–
Asia:								
British Malaya	12,274	10,306	–	–	–	–	–	–
Philippine Islands	1,928	501	461	–	–	–	–	–
Ceylon	(6)	201	481	3,145	–	–	–	–
Burma	(7)	[4] 15,558	–	–	–	–	–	–
Indochina	286	365	–	–	–	–	–	–
Syria and Lebanon	[4] 714	[4] 2,062	–	–	–	–	–	–
Macao	[4] 1,151	[4] 1,734	–	–	–	–	–	–
Other countries	14,901	14,696	–	–	–	10,548	234	74
Total	31,254	45,423	–	–	–	–	–	–
Africa:								
Algeria	29,770	[4] 30,127	–	–	–	–	–	–
Tunisia	1,617	[4] 7,232	–	–	–	–	–	–
French Morocco	3,269	7,130	5,896	2,213	4,128	–	–	–
Madagascar	[4] 362	[4] 314	–	–	17	–	2	–
Egypt[8]	138	172	45	146	596	(3)	–	–
French West Africa	206	[4] 407	–	–	–	–	–	–
French Equatorial Africa . .	92	116	–	–	–	–	–	–
Réunion	145	322	–	–	–	–	–	–
Mauritius	[4] 989	1,360	–	–	–	–	–	–
Union of South Africa . . .	[4] 1,039	90	3	3	–	–	–	–
Other countries	99	114	5	43	49	1	4	–
Total	37,726	47,384	–	–	–	–	–	–
South America:								
French Guiana	414	495	–	–	–	–	–	–
Other countries	3	62	–	–	–	–	–	–
Total	417	557	–	–	–	–	–	–
Oceania:								
New Zealand	(6)	[4] 658	652	615	–	–	–	–
New Caledonia	162	163	–	–	–	–	–	–
Other countries	58	115	–	–	–	–	–	–
Total	220	936	–	–	–	–	–	–
World total	144,323	190,809	–	–	–	–	–	–

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[1] Crude and refined in terms of crude.
[2] 1940-45 subject to revision.
[3] Less than 0.5 ton.
[4] Average of less than 5 years.
[5] Incomplete.
[6] Not separately classified.
[7] Included with India.
[8] Including butter for some years.

Compiled from official sources.

SOYBEANS AND OIL

SUMMARY

The world production of soybeans (fig. 3) is concentrated in Asia, where this crop has long been an important foodstuff. China and Manchuria have been the leading growers, producing about 75 percent of the average world output of approximately 465 million bushels of soybeans in 1935-39. During the war the United States soybean acreage underwent tremendous expansion in order to make up for the loss of tropical vegetable oils formerly imported from Japanese-occupied islands in the South Pacific. The 1945 soybean crop, almost 192 million bushels,is one of the largest ever produced in the United States. It may have been larger than either the Chinese or the Manchurian crop, both of which are believed to have decreased during the war.

European soybean production is small as compared with the crops of the United States and Asia. The only significant European producers have been the Soviet Union, Rumania, Hungary, Bulgaria, and Yugoslavia. The total output of the Balkans during 1935-39 averaged only 2.3 million bushels. Production increased in the soybean-growing areas under German occupation during the war but declined sharply when the Germans withdrew in 1945.

OUTLOOK

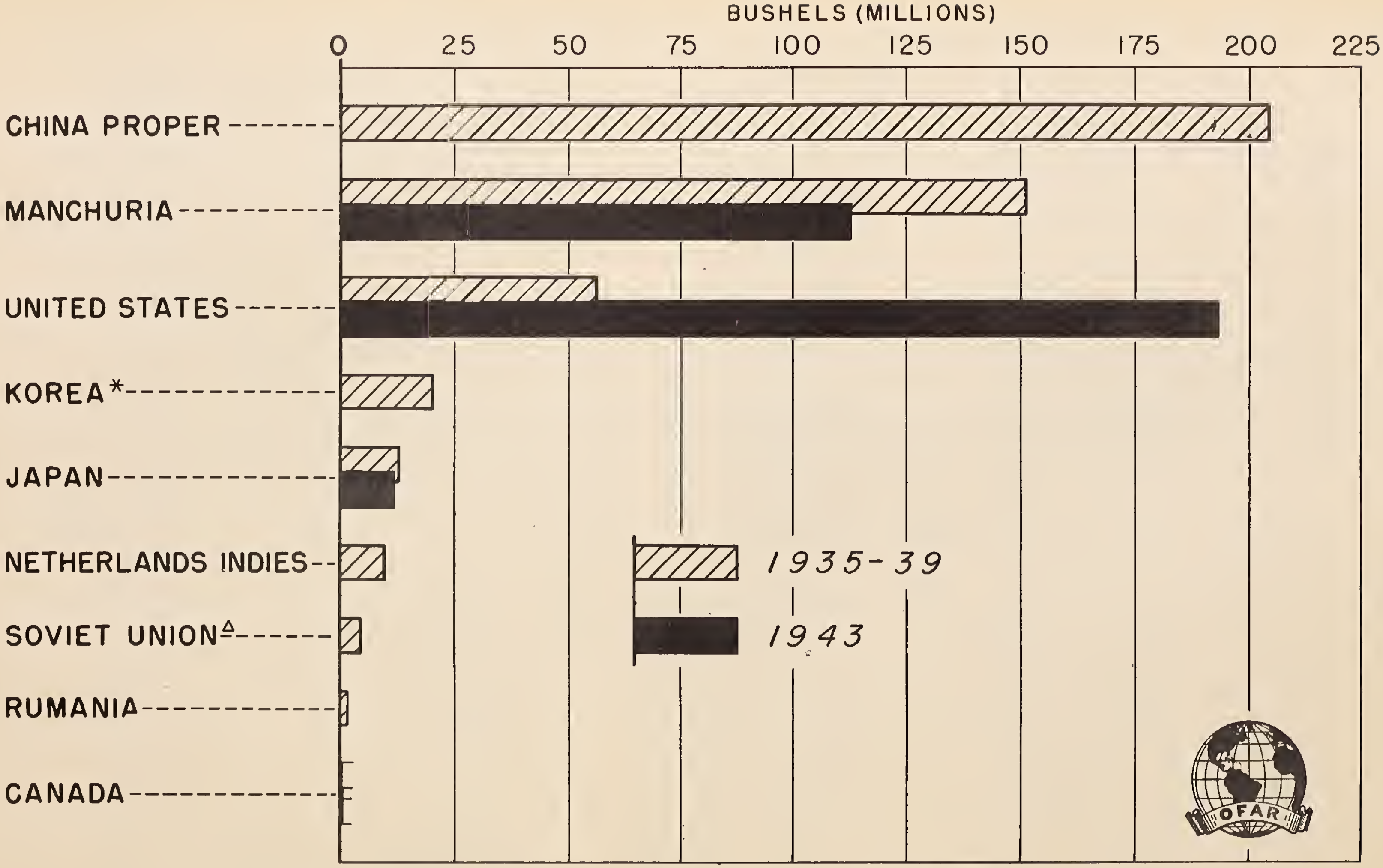
Production of soybeans in Asia will most likely increase but may not reach the prewar level in the near future, particularly in Manchuria. Although the bulk of the production will be consumed domestically as food, increased industrial uses, both domestic and foreign, may create additional markets for Asiatic soybeans. United States output can be expected to decrease from high production levels during the war years. The extent of reduction will depend on such factors as the price of imported oils and the profitability of competing crops, particularly corn and oats. The cultivation of soybeans is being introduced into many countries, and world production may be expected to remain at a high level.

TYPES AND USES

The soybean is an annual plant belonging to the family of Leguminosae. Among the numerous species, ***Soja max***, native to Asia but cultivated on many other continents, is of greatest economic importance. At the present time, more than 100 varieties of soybeans are successfully grown in the United States.

In China the oil is extracted from the seed by both primitive and more modern hydraulic presses. Modern crushing mills and a few solvent-extraction plants were operated in Manchuria prior to World War II. In Europe, especially on the Continent, most of the oil is obtained by solvent extraction, whereas in the United States pressing is more widespread. However, the tendency in this country is toward solvent extraction. On an average in most mills, 1 short ton of soybeans will yield by pressing between 290 and 300 pounds of oil. By solvent extraction approximately 350 pounds can be procured. The oil usually varies in color from yellow to dark amber, depending upon the extraction method and the variety and quality of the beans.

Soybean oil has qualities that make it adaptable for a wide range of uses. Prior to 1941, the quantity of soybean oil utilized for industrial uses, especially for paint preparations, was expanding. During the war, this oil was primarily restricted



*LESS THAN 5-YEAR AVERAGE

△ESTIMATE, BASED ON 1938 ACREAGE

†1943 DATA AVAILABLE FOR MANCHURIA, U.S., JAPAN AND CANADA ONLY.

FIGURE 3.–Production of soybeans, by principal producing countries, average 1935-39, and 1943† to use in edible products. The increased consumption of oil in foodstuffs occurred as a result of the shortage of other edible vegetable oils.

Soybeans, although little used for food in the United States, are an important item of diet in Manchuria, China, Korea, and Japan.

TABLE 11.- *Soybeans: Production by principal countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Million bushels	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*
China proper	-	204.4	216.8	[1]63.7	[1]54.0	[1]61.2	[1]60.5	[1]62.3
Manchuria	150.6	151.3	117.6	124.5	111.2	112.9	-	-
United States	6.9	56.2	77.5	105.6	187.1	193.1	190.4	191.7
Korea	21.0	17.7	-	-	-	-	-	-
Japan	14.7	12.5	11.7	8.6	11.0	11.4	10.0	12.5
Netherlands Indies	4.0	9.7	11.2	-	-	-	-	-
Soviet Union	-	[2]4.5	-	-	-	-	-	.9
Rumania	-	1.8	3.6	-	-	-	-	-
Bulgaria	-	.3	1.4	[3]2.7	[3].9	[3].5	[3].4	-
Canada	-	[4].2	-	.2	.9	.6	.7	.8
Formosa	-	[4].2	-	-	-	-	-	-
Hungary	-	.1	.2	-	-	-	1.1	(5)
Yugoslavia	-	.1	.3	.5	-	-	-	-
Brazil	-	-	-	-	-	-	[6].1	-
France	-	-	-	-	(5)	.1	.1	-
Indochina	-	[4].5	-	-	-	-	-	-
Siam	-	[4].6	-	-	-	-	-	-
Kwantung	-	[4].7	-	-	-	-	-	-
Estimated world total . .	-	465.0	450.0	500.0	540.0	545.0	545.0	545.0

[1] Free China only.
[2] Estimate based on 1938 acreage.
[3] Including southern Dobruja.
[4] Less than a 5-year average.
[5] Less than 50,000 bushels.
[6] Rio Grande do Sul only.

Compiled from official and trade sources.

PRODUCTION BY REGIONS

Asia

China

Of the world soybean area, approximately 27 million acres during 1935 and 1936, almost half was located in China. Chinese production during 1935-39 averaged nearly 205 million bushels. (See table 11.) Although the cultivation of soybeans in China is widely scattered, they are grown chiefly in the north, especially in the Provinces of Shantung, Kiangsu, and Honan. These three Provinces account for around 50 percent of the total soybean area of China, excluding Manchuria. During the war years, soybean acreage declined in the occupied areas on account of the shortage of human and animal labor, high cost of wages, and the reluctance of some farmers to plant. Exports of soybeans and oil from China proper have always been negligible, since practically all the production is consumed within the country. A survey made during the 1930's among Chinese farmers indicated that 55 percent of the soybean production was used for human food, 27 percent was crushed for oil, 10 percent used for feed, and 8 percent for seed.

Manchuria

Until the beginning of hostilities between Japan and the Western Powers, Manchuria ranked next after China as a world producer of soybeans and had almost a complete monopoly of world exports of both seed and oil. During 1935 and 1936, approximately one-third of the world acreage was located in Manchuria, mainly in the Provinces of Pinkiang, Fengtien, and Kirin. During these years around 26 percent of the total cultivated acreage was planted in soybeans. Neither grain sorghum nor millet, two of the most important food crops, occupied as much land. Production averaged over 150 million bushels annually during 1935-39 but fell to about 113 million bushels in 1943. As in the case of China, this decrease was the result of the war.

Other Countries

Korea occupied third place among the soybean-producing countries of Asia during prewar years. In the 1930's the area planted annually to soybeans remained almost stationary and averaged close to 2 million acres. Annual production was around 20 million bushels. Approximately one-sixth of the output was exported.

Japan, during the 1930's, devoted more than 800,000 acres to the cultivation of soybeans. Annual production averaged around 12.5 million bushels during 1935-39, and this output was fairly well maintained during the war. Japan ranked with Germany as an outstanding prewar importer of Manchurian soybeans.

In the Netherlands East Indies, primarily Java, the popularity of soybeans as a domestic food crop became widespread during the 1930's. By 1939 approximately 1 million acres of soybeans were reported under cultivation throughout the islands, with more than 75 percent of the crop on irrigated lands. By 1940, with the expanded production, imports from Manchuria had ceased and exports on a small scale had begun.

Western Hemisphere

United States

Increased planting of soybeans in the United States since 1900 has been phenomenal. The area under cultivation expanded from about 50,000 acres in 1907 to approximately 460,000 acres in 1917 and to 2.3 million acres in 1927. By 1937 soybean acreage more than tripled that of 1927, and by 1943 an all-time high of 15.8 million acres was reached, placing the United States among the leading soybean-growing nations of the world. Production in 1945 is estimated at nearly 192 million bushels.

At first soybeans were grown in the United States primarily as a forage crop. In recent years, however, especially during the war, the principal market was for soybean oil. The main producing area is in the Corn Belt States, although smaller quantities are grown in the Southern and Eastern States. During the war the United States became the largest exporter of soybeans and oil, except for possible Manchurian shipments to Japan.

Other Countries

The cultivation of soybeans in other countries of the Western Hemisphere is relatively unimportant. Increased plantings took place during the war in Canada and Brazil, but production was only for domestic consumption. Canadian production, averaging around 200,000 bushels during 1935-39, reached almost 1 million bushels in 1942 but tapered off thereafter. The greater part of the Canadian acreage is located in Ontario.

Brazilian output, principally in the State of São Paulo, was estimated at 125,500 bushels in 1944. In Argentina the Ministry of Agriculture announced in 1944 that steps would be taken to stimulate soybean production, especially in the northwestern Provinces. Chilean soybean output declined during the war in favor of sunflower cultivation. In 1943 soybean production was estimated at only 1,800 bushels.

Europe

Soybeans became established as a commercial crop in Europe, excluding the Soviet Union, only during the past two decades. Rumania was the leading producer until Bessarabia was lost to the Soviet Union. This one Province contributed approximately 80 percent of the Rumanian soybean output. In 1940 approximately 3.6 million bushels were produced in Rumania, or twice the 1935-39 average. The increase in soybean production was chiefly due to German purchase guaranties.

Soybean cultivation continued its upward trend in the neighboring countries of Bulgaria, Yugoslavia, and Hungary under German occupation during the early part of the war. The total output of these three countries about equaled that of Rumania, including Bessarabia. Although Hungarian output reached a record of 1.1 million bushels in 1944, production in 1945 declined sharply in Hungary, as well as in the other Balkan countries.

Small amounts of soybeans are grown for local consumption in France, Czechoslovakia, Germany, Italy, Poland, Portugal, and Sweden.

Soviet Union

After World War I interest in soybean cultivation was awakened in the Soviet Union. The acreage rapidly expanded during the 1920's, rising from less than 50,000 acres in 1924 to over 1.1 million acres in 1931. During the 1930's the acreage declined, owing primarily to insufficient knowledge of variety adaptability to various climatic zones, and there were many crop failures. In 1938 the sown area throughout the Union totaled about 470,000 acres. During the war the acreage is believed to have decreased. The principal regions of soybean cultivation are the Ukraine, Soviet Far East, and North Caucasus. Under the recently announced Five Year Plan the goal set for soybeans is approximately 755,000 acres, with the major expansion planned to occur in the central regions of the Union.

WORLD TRADE

Before the war, Manchuria, virtually monopolizing exports of soybeans, supplied about 90 percent of the world total, or nearly 70 million bushels annually during 1935-39. (See table 12.) Japan, Germany, and Denmark were the principal recipients. Often 50 percent of the Manchurian soybean crop was exported. An additional quantity was crushed for oil, and 1935-39 exports, which averaged over 78,000 short tons of oil, or about 60 percent of the world total, went primarily to Europe and China. Exports of these two commodities represented 45 percent of the value of all Manchurian exports in 1936. During the war, Japan was the only outlet for the surplus of soybeans and oil.

United States exports of soybeans in 1945 amounted to 7 million bushels, a total exceeded only in 1939. Oil shipments were around 19,100 short tons as against 31,100 tons in 1944. The 1945 bean exports were destined primarily for France, Canada, Belgium, the Netherlands, Norway, and the United Kingdom; oil shipments went to the Soviet Union, Cuba, Canada, and the French West Indies.

Korea, ranking third as an exporter of soybeans during 1935-39, shipped an average of 3.3 million bushels to Japan. Small amounts from Rumania, Bulgaria, and Yugoslavia moved principally to Germany. Prior to Japanese occupation, the Netherlands East Indies became a net exporter of soybeans.

TABLE 12.- *Soybeans and oil: Exports and imports, by specified countries, averages 1925-29 and 1935-39*

SOYBEANS			SOYBEAN OIL		
COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39
	Million bushels	*Million bushels*		*1,000 sh. tons*	*1,000 sh. tons*
EXPORTS:			EXPORTS:		
Manchuria	-	69.2	China	122.4	0.3
China	62.2	.1	Manchuria	-	[1] 78.6
Korea	[2] 5.5	[2] 3.3	Germany	25.6	[4] .1
Japan	.1	(3)	United Kingdom . . .	25.0	10.6
United States . . .	0	3.6	Netherlands	20.0	9.5
Bulgaria	-	.3	Denmark	18.4	13.8
Yugoslavia	-	.1	Sweden	6.5	4.8
Netherlands Indies .	(3)	.2	Japan	7.2	5.1
			United States	2.3	3.2
Est. world total .	70.0	80.0	Est. world total .	230.0	130.0
IMPORTS:			IMPORTS:		
Germany	23.2	21.9	Netherlands	54.6	11.3
Japan	16.8	24.3	United Kingdom . . .	38.0	15.5
Denmark	6.6	7.6	Italy	[4] 15.1	2.6
United Kingdom . . .	5.1	3.5	Germany	15.0	[4] 7.8
Netherlands Indies .	3.3	.1	United States	9.8	4.8
Sweden	2.8	4.6	Belgium	[4] 9.6	4.6
Italy	[4] 2.6	1.0	Chile	[5] 8.8	1.5
Netherlands	1.8	3.7	France	8.6	[4] 1.9
Formosa	.9	[4] 1.5	Sweden	5.1	3.9
France	.1	[4] .9	Morocco	[4] 4.9	[4] 5.6
Belgium	-	.6	Norway	4.4	[4] 6.8
Soviet Union	-	[2] .3	Algeria	3.2	[4] .1
United States . . .	.1	(3)	Austria	3.0	[4] 8.3
British Malaya . . .	-	.2	Denmark	1.8	1.5
Canada	-	[4] .1	Czechoslovakia . . .	.7	[4] 2.5
			Japan	.2	2.0
Est. world total .	65.0	75.0	Est. world total .	225.0	125.0

[1] First 9 months only.
[2] Net trade.
[3] Less than 50,000 bushels.
[4] Less than a 5-year average.
[5] 1 year only.

Compiled from official sources.

SUNFLOWER SEED AND OIL

SUMMARY

The 1946 harvest of sunflower seed may equal the record 1944 world production of 4.1 million short tons (fig. 4). This forecast compares with the 1945 estimate of 3.9 million tons and the 1935-39 average annual output of 2.8 million tons. The first official Argentine production estimate for 1946 was placed at 1.1 million tons and only slightly less than the 1945 crop. The 1946 acreage, however, was the largest ever reported for Argentina - 8.6 percent greater than that of 1945. Because of the demand for fats and oils in Russia, many observers believe that the 1946 sunflower acreage surpassed that of 1945, which was around 8 million acres, only slightly less than the prewar average. Furthermore, weather conditions, which were unfavorable for the 1945 crop of the Soviet Union, may have been more beneficial to this year's production. If a reduction from the high wartime acreage occurred in the Balkan countries, the effect of any resulting decline in 1946 production on total world output will be more than compensated for by the crops expected in Argentina and the Soviet Union.

OUTLOOK

During the war sunflower-seed oil has come into use in several countries formerly not well acquainted with this commodity. It has been found to be a desirable edible oil, and its use may be continued in preference to other edible fats and oils in the postwar period. The extent to which it will enter international trade in the next few years will depend largely upon cost of production. When the world supply of fats and oils becomes sufficient to meet all reasonable requirements, the consuming countries then may begin to import lower priced oils. While sunflower-seed oil competes directly with cottonseed, soybean, and peanut oils, in the long run it will likely come into competition with the lower priced oils, such as coconut, palm, and whale.

USES

Sunflower seed contains from 22 to 32 percent oil, with an average rate of extraction of about 25 percent. Cold-pressed oil is usually pale yellow in color, and it has a bland, pleasant taste. It compares favorably with other edible oils, such as cottonseed and peanut. Its main usage has been in the manufacture of margarine and compounds. It is also favored as a salad and cooking oil. The hot-pressed oil, orange in color, is employed in the manufacture of soap and toilet preparations, in lubricants and paint, and for treating wool. In Europe, it also has been used as an illuminant. In some countries, especially the Soviet Union, the seeds of certain varieties are toasted and eaten as a confection.

PRODUCING AREAS

The sunflower, ***Helianthus annuus***, is believed to have originated in the Americas, probably in Mexico or Peru. It has been extensively cultivated in Russia for a number of decades and more recently in the Balkans. In the past 10 years, there has been a great expansion of this crop in Argentina. The increase in production has been most noteworthy since 1940, and Argentina provided sizable quantities of edible oil for export during World War II.

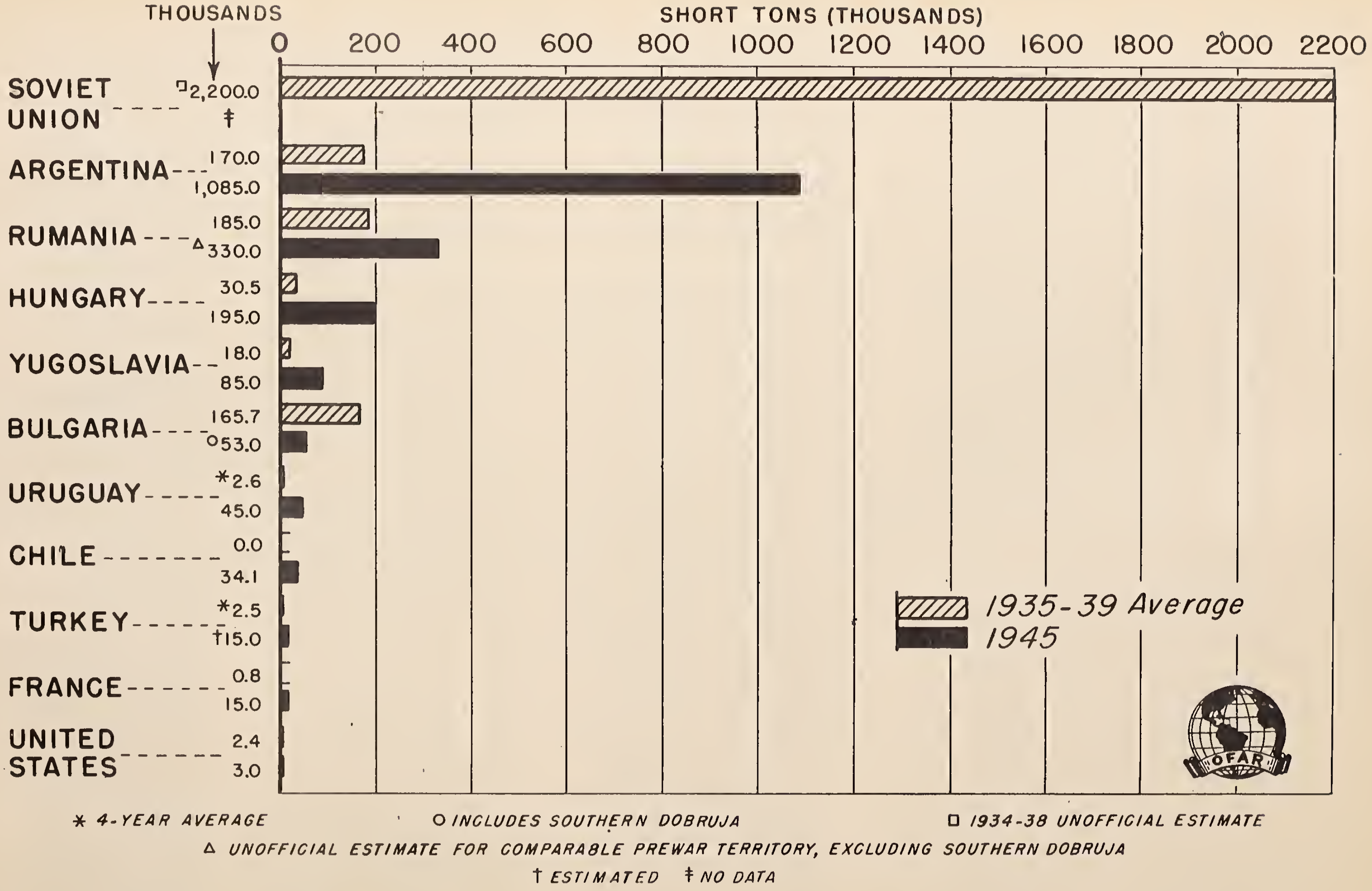


FIGURE 4.-Estimated production of sunflower seed in specified countries, average 1935-39, and 1945

Soviet Union

During the prewar years almost 80 percent of the world production (table 13) of sunflower seed was concentrated in the Soviet Union. In that country sunflowers held first place as an oil-bearing crop. Despite the large production of around 2.5 million tons yearly, practically all the seed was consumed domestically.

TABLE 13.- *Sunflower Seed: Estimated world production,*[1] *averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
North America:								
United States	5.8	2.4	2.3	3.8	1.3	1.3	2.7	3.0
Canada	–	–	–	–	–	2.7	4.3	[2] 1.5
Mexico	–	–	–	–	–	.5	.5	.6
Estimated total	6.0	2.5	2.5	4.0	1.5	4.5	7.5	6.1
South America:								
Argentina	1.2	170.0	413.4	654.8	738.5	462.1	1,142.0	1,085.0
Chile	–	–	1.9	4.3	8.2	14.2	20.0	34.1
Uruguay	–	[3] 2.6	25.4	50.7	33.6	6.3	36.4	45.0
Paraguay	–	[4] 4.3	–	–	–	–	–	–
Estimated total	3.0	180.0	442.0	710.0	782.0	485.0	1,200.0	1,138.0
Europe:								
Bulgaria	35.4	165.7	144.0	[5] 172.0	100.0	85.0	95.0	53.0
Czechoslovakia	–	[4] 6.3	–	–	–	–	–	–
Hungary	24.2	30.5	–	–	–	–	–	195.0
France	–	.8	–	–	5.6	22.7	24.6	15.0
Rumania	124.4	185.0	–	–	–	–	–	[6] 330.0
Yugoslavia	–	18.0	–	–	–	–	–	85.0
Italy	–	–	–	–	–	–	18.3	7.2
Estimated total	200.0	410.0	435.0	620.0	645.0	715.0	850.0	690.0
Soviet Union	2,165.0	[7] 2,200.0	2,700.0	–	–	–	–	–
Asia Minor:								
Turkey	–	[3] 2.5	–	19.0	16.5	16.5	16.5	–
Estimated total	2.0	2.5	12.0	19.0	16.5	16.5	16.5	15.0
Africa:								
South Rhodesia	.9	[3] 1.5	–	–	–	–	–	–
Estimated total	1.5	2.0	2.0	2.5	2.5	2.5	3.0	3.0
Oceania:								
Australia	–	[3] .3	.3	.3	.2	.2	–	–
Estimated total	.3	.5	.5	.5	.5	.5	.5	.5
Estimated world total	2,380.0	2,800.0	3,595.0	3,115.0	3,350.0	3,125.0	4,080.0	3,855.0

[1] Year of harvest.
[2] Commercial production only.
[3] 4-year average.
[4] 3-year average.
[5] Includes southern Dobruja from 1941 onward.
[6] Unofficial estimate for comparable prewar territory, excluding southern Dobruja.
[7] 1934-38 unofficial estimate.
Compiled from official and trade sources.

Approximately 8 million acres of sunflower seed are believed to have been under cultivation yearly from 1934-38. The principal growing region was the Ukraine, which accounted for about 25 percent of the total output. Other ranking producing regions were in North Caucasus and the Volga and Don Valleys. Soviet agricultural scientists had done considerable research to develop new improved varieties of sunflower seed, and apparently a substantial percentage of the acreage was being planted with these high-yielding strains before the war.

After the German occupation of the Ukraine and adjacent regions, almost half the former sunflower acreage was lost to Russia. By 1943, however, new areas had been planted in central Russia and parts of the eastern uninvaded area. In the uninvaded area, the acreage sown appears to have been around 75 percent of the prewar average. In 1944, it was around 8 million acres and in 1945 slightly higher.

Because of unfavorable weather and shortages of draft power and manpower, harvesting in 1945 was delayed. In certain areas crop losses of 50 percent were reported. Probably the total output was smaller than in 1944, despite a larger acreage.

Europe

Sunflower-seed production in Europe is concentrated in the Balkan countries. During 1935-39, the total average yearly output of Bulgaria, Hungary, Rumania, and Yugoslavia amounted to almost 15 percent of world production. After the German occupation of these countries, an intensive effort was made to increase production. These efforts met with success, and the total output moved from the prewar average of 405,000 short tons to around 805,000 tons in 1944, the year of the largest harvest. Because of the numerous territorial changes in these countries a comparison of increases in individual regions with the prewar situation is difficult to make.

In the leading producing country of Rumania, sunflower cultivation constituted about 75 percent of all the oilseeds grown. In the other Danubian countries sunflowers held a similar ranking position. In most of these countries the greater portion of this crop is interplanted, mainly with corn.

During the prewar years, trade in sunflower seed and oil was almost entirely confined to shipment of these commodities from Bulgaria and Rumania. Rumanian exports of sunflower seed averaged about 31,000 tons yearly during 1935-39, and those from Bulgaria for the same period averaged about 50,000 tons. Exports of sunflower oil from the producing countries generally averaged less than 10,000 tons. Small amounts of oil, however, made from seed imported from the Balkan countries were exported from Netherlands and Denmark.

Western Hemisphere

Sunflower cultivation was first begun in Argentina about 1900, when the first plantings were made by Russian immigrants. The crop did not become of much importance until the mid-1930's, when olive oil became difficult to obtain from Europe. Since that time, sunflowers have gained considerable favor with the Argentine farmers. Remunerative prices and high yields have proved a good inducement.

Next after flaxseed, the leading oilseed in Argentina is the sunflower. Because it was less affected by drought, sunflower-seed output in 1944-45, on a gross tonnage basis, exceeded flaxseed production for the first time in the history of Argentina, and by a margin of 25 percent. Without question, the plant has earned a permanent place in Argentine agriculture, and, although the acreage may decrease with the restoration of fat and oil production elsewhere in the world several years hence, it is doubtful if the crop will drop back to its prewar level. Farm equipment has been developed for the mechanical harvesting of seed, and producers have been successful in reducing the amount of hand labor required.

The outturn of the crop has been generally favorable in the last decade, except in the 1942-43 season, when drought conditions caused quite a reduction in yields. During the past 10 years, better knowledge of the requirements of the crop and improved cultural methods have succeeded in raising the yields from about 500 pounds per acre to almost 850. The fertile soils of the Pampa have been particularly well suited to sunflower cultivation. The Province of Buenos Aires produces about 50 percent of the crop, with Córdoba and Santa Fé growing about 25 and 14 percent, respectively. (See table 14.)

TABLE 14.- *Argentina: Area, production, and export of sunflower seed and oil*

YEAR[1]	AREA		PRODUCTION		EXPORTS
	SOWN	HARVESTED	SEED	OIL	SEED
	Acres	*Acres*	*Short tons*	*Short tons*	*Short tons*
1933-34	140,300	(2)	-	(2)	10,900
1934-35	206,700	(2)	68,100	(2)	5,200
1935-36	306,000	(2)	81,000	(2)	1,500
1936-37	510,800	(2)	139,800	(2)	(3)
1937-38	787,400	(2)	265,700	(2)	3,200
1938-39	823,300	-	321,700	(2)	17,100
1939-40	1,248,800	1,051,200	413,400	(2)	26,100
1940-41	1,418,000	1,333,800	654,800	13,100	19,300
1941-42	1,852,500	1,677,400	738,500	65,500	38,600
1942-43	1,664,800	1,255,300	462,100	35,900	22,200
1943-44	3,886,500	3,107,500	1,142,000	54,500	40,000
1944-45	3,682,800	-	1,085,900	[4] 73,400	[4] 31,500
1945-46	[5] 4,001,200		[5] 1,079,200		

[1] Area data refer to first year and production and exports to the latter.
[2] Data not available.
[3] Less than 1,000 tons.
[4] 11 months only.
[5] First estimate.
Compiled from official sources.

The average 1935-39 sown acreage of sunflowers in Argentina was 527,000 acres. In 1943-44, the area planted increased to 3.9 million acres and in 1945-46 to 4 million acres, the largest acreage on record. Production of sunflower seed increased from the prewar average of 170,000 short tons to 1.1 million in 1944. In 1946 a harvest of about 1.1 million tons is expected.

At the present time, Argentina is the only noteworthy exporter of sunflower seed and oil. Prior to 1940 it apparently made only limited shipments of sunflower oil, but shipments in 1945 totaled about 77,000 tons. During 1935-39, exports of sunflower seed averaged 5,400 tons annually, and shipments in 1945 reached almost 35,000 tons. In the past decade, Argentina has developed a sizable crushing industry, which accounts for the greatly increased shipments of oil in recent years. During the war years, the United States has been the principal buyer of sunflower seed and oil, and supplies of these commodities have been under allocation by the Combined Food Board for distribution among the United Nations. Small shipments were also made to other Latin American countries.

Uruguay is the second ranking producer in the Americas. Production in that country increased rapidly after 1938, when 19,300 acres were sown. By 1941 plantings had increased to 143,000 acres, and in 1944 they totaled 198,000 acres. Production increased from the prewar average of 2,600 tons to 45,000 tons in 1945. The Departments of Paysandú, Salto, Soriano, Artigas, and Colonia are the leading producing regions.

Before the war, Chile produced only limited quantities of oilseeds. Virtually all requirements for fats and oils were met by importation. In 1940, the Government began to promote the cultivation of oleaginous crops. Since that time, sunflower-seed production has expanded rapidly, and the oil has enjoyed widespread acceptance. The sown acreage increased from 3,000 acres in 1938 to 51,000 acres in 1944 but decreased to 38,000 acres in 1945. Most of the crop is grown in the north central section of the country near Santiago, with smaller areas being planted in the northern and south central regions.

The Republic of Paraguay has a small sunflower acreage and had an estimated production of around 400 tons in 1945. At the present time, Mexico produces about 500 tons of sunflower seed. The most important center of production is in the State of San Luis Potosí. No marked increases are expected because of competition from other established oilseed crops, such as peanut and sesame.

In the United States, the sunflower has been of significance only as a source of poultry feed - not of oil. Its culture as a silage crop in certain States has been of limited importance. California is the leading producer. Following an average yearly output of 5,800 tons during 1925-29, the crop in more recent years has averaged only about two-thirds that amount.

In Canada some little interest has been shown in the cultivation of sunflowers, grown until 1943 on a minor scale as a silage crop and for experimental purposes. Although production has been fostered by the Government during the past 3 years, the acreage has fallen short of that desired. In 1943, 12,400 acres were reported, and by 1945 only 9,200 acres. The principal growing regions have been Manitoba and Saskatchewan.

OLIVES AND OIL

SUMMARY

The 1946 preliminary world estimate of edible olive oil from the 1945-46 olive crop in the principal producing countries, totaling 573,700 short tons, is the smallest output since 1931. This estimate compares with 779,500 tons produced in 1945 and is 40 percent less than the 5-year 1935-39 average. Production in the coming year, however, appears likely to show a marked increase.

Growing conditions in most countries during 1945 were unsatisfactory. Drought throughout the Mediterranean area in July and August of that year was the principal cause for such small production. Other contributing factors were lack of insecticides, fungicides, fertilizer, and transportation; war damage; and the heavy crops of the previous year in some countries. The heaviest decline in output occurred in Tunisia, followed by Italy and France. Certain other countries, notably Greece, Palestine, Syria and Lebanon, and Turkey, reported larger production.

The world-wide shortage of edible fats and oils prevented many countries in this area from importing cheaper vegetable oils from abroad, thus increasing the demand for the limited domestic production of edible oils. In general, practically every country prohibited free exportation of olive oil, and nearly all of them put into effect some form of rationing or equitable distribution system for the available oil.

Early this year, after considerable discussion among United States Government agencies, members of the trade, and other parties, a proposal was made that the United States would exchange soybean oil for equal quantities of edible olive oil with the Mediterranean countries. Several countries agreed to this arrangement. On April 9, Spain assented to the exchange of 5,500 short tons of olive oil. Smaller exchange quantities were agreed upon by Italy and Syria and Lebanon. Negotiations are still going on with other countries which may eventually result in further exchange. Total exports of olive oil during 1946 are expected to be from 10,000 to 15,000 tons compared with the 1935-39 average of 174,000 tons.

There would be a great many obstacles to overcome in most producing areas even if the olive oil output had been larger. Transportation is badly disorganized, and there is a shortage of drums. The shortage of all foods and a general lack of confidence in local currencies have brought about widespread black-market operations and high prices.

OUTLOOK

The movement of olive oil from the Mediterranean Basin to the Western Hemisphere seems likely to be resumed as soon as the most pressing needs for fats and oils in Europe have been met and transportation facilities are again available. The potential increase in production in certain Mediterranean countries is somewhat limited by scarcity of suitable land. No material increase in the Basin's total production appears probable. A reasonable assumption therefore is that, while some changes may take place in the over-all trade and production in the postwar years, the net amount available for export to foreign countries will not differ greatly from the prewar volume.

There appears to be possibility of further expansion of olive acreage in such situations as those existing in parts of the Americas, although no considerable further production can be expected in the Mediterranean Basin. The possibilities and advisability of developing or expanding olive and olive-oil production will depend on such factors as increased competition from cheaper oils, cost of production, and the importance of these foods in the national diets of the various countries.

USES

Olive oil is considered the finest of the edible oils. It is greenish yellow in color and has a characteristic, pleasant flavor. In contrast to most other edible oils, olive oil is consumed as a food usually without refining or further processing. The olives are commonly crushed in stone "edge runners." From the first crushing the highest grade oil, called virgin, is obtained. From the several subsequent crushings, poorer grades of oil result. The oil from the final press is mostly used for soap making.

PRODUCTION

The production of olives for oil is concentrated in the Mediterranean Basin, where the oil has been produced and consumed for centuries. This area produces probably 98 percent of the world's total olive output and practically all the olive oil that enters international trade. Much of the oil is consumed in the area also, since it is one of the staple items of diet for rich and poor alike.

Mediterranean Basin

In the Mediterranean countries efforts have been made to increase production through new plantings, grafting, irrigation, and the like. The installation of more modern and efficient oil presses has also been encouraged. The most notable progress was made in Tunisia, where the industry is well-organized. The latest country actively to encourage expansion is French Morocco, where it is planned to treble olive acreage in the next 15 years. The leading producing countries are Spain, Italy, Greece, and Tunisia (table 15).

United States

The United States is the only country outside the Mediterranean Basin that produces a significant quantity of edible olive oil, but even so production is less than domestic requirements. It might be supposed that early Spanish settlers in Latin America would have brought olive trees with them and developed that phase of agriculture. They did bring olive trees but for various reasons made no large-scale olive plantings, and consequently no industry of major importance developed. Many of the Latin American countries, particularly, Argentina, Mexico, and Peru, have a few olive trees and minor olive-oil and picked-olive industries.

Elsewhere in the world, Australia and South Africa are reported to have relatively small acreages of olives, though they have ample suitable land and favorable climatic conditions. Relatively high labor costs and the competition of other export crops undoubtedly are deterring factors. The length of time involved from planting to realization of a reasonable return no doubt has discouraged farmers in these countries as well as in others.

CULTIVATION

The production of olive oil, unlike that of many other edible oils, cannot be materially increased on short notice. Olive trees require approximately 10 years to reach the commercially profitable bearing state; therefore, any contemplated increase in production must be planned for a decade in advance. The production of olives, and consequently of olive oil, frequently follows a 2-year cycle; that is, a good crop is followed by a medium or poor crop. Weather plays an important part. Adverse weather at pollination and during the early set period can result in a very poor crop and upset the cycle.

The olive tree is extremely long-lived and can stand considerable neglect and still continue in production. Trees in the Mediterranean region, the native habitat, reported in some cases to be from 500 to 600 years old, still yield small quantities of fruit. The oil content of olives differs greatly as to variety. Olives used primarily for pickling generally are low in oil content and are not generally utilized for oil. There are some dual-purpose varieties, such as the "California Mission," which are suitable for both oil and pickling.

TABLE 15.- *Edible Olive Oil:*[1] *Estimated world commercial production, averages 1930-34 and 1935-39, annual 1940-46*[2]

COUNTRY	AVERAGE 1930-34	AVERAGE 1935-39	1940	1941	1942	1943	1944[3]	1945[3]	1946[4]
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Europe:									
France	10,600	9,700	11,000	9,000	7,000	4,200	4,400	9,000	5,500
Greece	114,500	111,800	115,500	115,300	96,700	91,500	88,900	67,100	99,000
Italy	221,700	223,000	300,000	168,800	223,200	198,600	197,000	264,400	110,000
Portugal	58,600	51,500	77,000	56,000	73,300	33,000	90,000	44,000	39,100
Spain	392,900	433,200	220,000	350,000	418,000	264,000	440,000	242,000	220,000
Yugoslavia	5,200	4,400	4,700	2,800	4,000	3,000	3,300	1,500	2,000
Others	500	500	500	500	500	500	500	500	500
Total	804,000	834,100	728,200	702,400	822,700	594,800	824,100	628,500	476,100
Middle East:									
Palestine	2,800	6,600	4,900	11,600	2,200	10,400	10,900	3,000	13,000
Syria and Lebanon	12,800	14,200	10,400	11,800	8,600	19,800	11,800	11,900	23,000
Turkey	24,200	29,500	45,000	29,700	38,500	35,200	27,500	26,400	33,000
Others	500	500	500	500	500	500	500	500	500
Total	40,300	50,800	60,800	53,600	49,800	65,900	50,700	41,800	69,500
Africa:									
Algeria	19,900	15,400	25,000	10,300	20,600	17,600	20,900	16,500	8,800
French Morocco . .	10,600	9,800	13,200	19,800	10,600	13,200	5,300	3,800	3,300
Tunisia	57,900	46,400	77,000	17,600	26,700	55,000	38,500	82,500	8,800
Libya	3,300	2,700	2,000	2,500	3,800	1,300	1,600	2,200	3,000
Others	200	200	200	200	200	200	200	200	200
Total	91,900	74,500	117,400	50,400	62,000	87,300	66,500	105,200	24,100
Western Hemisphere:									
United States . .	800	1,900	1,900	5,200	3,400	4,800	2,800	-	-
Argentina	-	60	30	110	185	-	-	-	-
Others	100	100	150	150	200	200	250	250	300
Total	900	2,100	2,200	5,500	3,800	5,000	3,100	4,000	4,000
Estimated world production	937,100	961,500	908,600	811,900	938,300	753,000	944,400	779,500	573,700

[1] Edible-olive-oil production amounts to about 90 percent of the total world output.

[2] Harvesting begins in preceding fall, but most of the oil is produced in the year shown.

[3] Preliminary estimate.

[4] Preliminary forecast.

Compiled from official and trade sources.

TABLE 16.- *Edible Olive oil: Imports into specified countries, averages 1930-34 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1930-34	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Mediterranean Basin:								
Algeria	470	554	1,563	3,931	216	-	-	-
France	27,058	[1]31,357	98	-	-	-	-	-
French Morocco	1,841	[1]659	-	-	-	-	-	-
Italy	54,092	29,836	34,905	5,867	7,871	-	-	-
Palestine	175	82	-	-	-	-	-	-
Portugal	5,134	3,423	0	0	-	-	-	-
Syria and Lebanon . . .	306	[1]77	-	-	-	-	-	-
Tunisia	175	[1]279	-	-	-	-	-	-
Others	2,524	1,775	-	-	-	-	-	-
Total	92,086	67,552	-	-	-	-	-	-
Western Hemisphere:								
United States	36,557	31,400	25,040	5,060	3,493	1,644	150	4,525
Argentina	43,670	16,904	9,609	608	11	-	-	-
Chile	1,610	1,108	212	242	130	3	-	-
Brazil	5,534	4,845	4,236	1,663	1,121	301	-	-
Total	87,362	54,257	39,097	7,573	4,753	-	-	-
Grand total	179,448	121,809	-	-	-	-	-	-

[1] 4-year average.

Compiled from official sources.

TRADE

Approximately 15 to 20 percent of the total olive-oil production prior to the outbreak of the World War II moved into international trade (tables 16 and 17). Many of the Mediterranean countries were both exporters and importers of olive oil. In several countries there was a growing tendency to export the relatively high priced olive oil to overseas markets and import peanut and other lower priced oils for domestic consumption. The principal olive-oil-importing countries in the Western Hemisphere prior to 1939 were the United States and Argentina. Between the two World Wars olive oil in substantial quantities was exported to the Western Hemisphere, where it commanded a high price.

TABLE 17.- *Edible Olive Oil: Exports from specified countries, averages 1930-34 and 1935-39, annual 1943-45*

COUNTRY	AVERAGE 1930-34	AVERAGE 1935-39	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Algeria	12,633	10,649	-	-	-
France	10,963	[1]17,819	0	-	0
French Morocco	1	[1]4,796	-	-	-
Greece	16,011	16,619	-	-	-
Italy	37,744	21,559	-	-	-
Portugal	3,466	6,811	371	804	896
Spain	79,207	[2]47,423	15,658	21,909	-
Syria and Lebanon	2,314	[1]8,827	-	--	-
Tunisia	39,811	[1]32,953	-	-	-
Turkey	10,449	4,613	-	-	-
Others	972	1,836	-	-	-
Total	213,571	173,905	-	-	-

[1] 4-year average.
[2] Estimated.

Compiled from official sources.

SESAME SEED AND OIL

SUMMARY

The world production of sesame seed in 1945 was estimated at nearly 1.5 million short tons, approximately a 15-percent decline in comparison with the prewar average (1935-39) of around 1.8 million tons. Before the war Asia produced nearly 95 percent of the world sesame supply, but, with the commercial cultivation of this oleaginous crop in Latin America during the past decade, the proportion has now declined to about 85 percent.

China, by far the leading grower of sesame, produces around half the world total. The next ranking producers during the war years were India, producing about 33 percent, and Mexico, between 4 and 7 percent. The rest of the sesame-growing areas are widely scattered throughout the tropical and subtropical zones. Production for 1946 is not expected to show any marked change. The largest percentage of the oil is consumed in countries producing the seed.

TYPES AND USES

Sesame seed are white (pale yellow), dark red, brown, or black. Commercially, they are known as white or black. The color of crude sesame oil varies from yellow to dark amber. The white seed are reported to yield a superior quality but a smaller quantity of oil than the dark seed. The light-colored oil generally comes from *Sesamum indicum*, of which there are several known varieties. The black seed are usually from *Sesamum augustifolium*, which produces an oilseed of less value than that of *Sesamum indicum*. In Venezuela, experimental work has been started on sesame by a geneticist. This work, started in early 1940, gives promise of producing a plant with a superior seed.

The seed are not only used for the production of oil, but in several countries they are used in confectionery products and also sprinkled on the top of rolls, bread, and cakes. Sesame oil is a highly desired edible product and is much used as a salad and a cooking oil. It is also used in the manufacture of margarine, shortenings, lard substitutes, and soap and, to some extent, for pharmaceutical purposes.

PRODUCING REGIONS

Asia

China is the world's foremost producer of sesame seed, of which the output during the past decade ranged between 443,000 and 895,000 short tons (table 18). The bulk of the crop is cultivated in the Yangtze Valley, where it was normally consumed as an edible oil. The war and the Japanese occupation have not greatly reduced the acreage planted, reports disclose. Exports prior to the war followed no definite trend but varied from 3 to 18 percent of total production.

In India sesame is cultivated over a widespread area. More than 50 percent of the crop is produced in the British Provinces, consisting of the United Provinces, Bombay, and Madras. The area of sesame under cultivation in all India during 1945 was approximately 3.8 million acres in contrast to 4.0 million acres in 1944. The 1945 crop was estimated at 430,000 short tons, or about 25 percent less than the more normal 1935-39 average outturn. Indian exports have represented from less than 1 to 5 percent of the total production.

Table 18.- *Sesame Seed: Estimated world production, by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

CONTINENT AND COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Asia:								
China	–	[1] 895.0	752.0	672.4	443.0	618.4	642.6	704.3
India	555.0	562.2	572.3	463.7	511.7	501.0	440.0	429.0
Burma	50.3	56.2	58.3	62.7	–	–	–	40.0
Turkey	28.4	31.7	47.8	38.0	33.0	35.6	13.2	11.0
Manchuria	–	[2] 16.3	28.6	–	–	–	–	–
Iraq	–	[2] 15.6	–	8.8	3.8	4.4	22.0	–
Iran	–	[2] 7.2	–	–	–	–	–	–
Palestine	3.6	6.2	7.2	8.2	8.6	6.2	9.7	–
Korea	4.6	4.4	–	–	–	–	–	–
Japan	3.9	4.2	5.4	4.4	5.0	–	–	–
Syria and Lebanon	4.4	4.0	–	–	3.9	2.9	–	1.0
Netherlands Indies	–	3.6	3.1	–	–	–	–	–
French Indochina	–	[1] 3.3	–	–	–	–	–	–
Trans-Jordan	–	2.7	–	–	–	1.3	2.9	–
Formosa	–	–	–	2.0	–	–	–	–
Estimated total	1,500.0	1,615.0	1,510.0	1,310.0	1,120.0	1,275.0	1,220.0	1,250.0
Africa:								
Sudan	28.5	35.5	35.0	47.0	56.4	44.0	54.5	–
Nigeria	–	16.5	–	–	–	–	–	–
Belgium Congo	[3] 11.8	–	–	–	–	–	–	–
Egypt	4.7	6.4	6.0	7.2	6.6	9.0	14.9	11.5
Somaliland, Italian	–	[3] 1.6	–	–	2.2	15.2	–	–
Tanganyika	4.0	6.1	–	–	–	–	4.3	5.6
French Guinea	[2] 4.8	[2] .8	–	–	–	–	–	–
Uganda	–	–	1.8	2.0	1.5	3.0	–	–
Estimated total	75.0	85.0	85.0	90.0	110.0	105.0	130.0	110.0
Western Hemisphere:								
Mexico	13.0	29.2	38.3	64.8	96.0	86.8	88.4	88.0
Nicaragua	–	–	–	4.7	4.5	3.6	3.3	3.7
Colombia	–	[3] .3	.6	1.0	3.3	6.8	–	4.0
Venezuela	–	[2] 1.0	2.2	–	–	.5	3.3	–
Estimated total	15.0	35.0	45.0	75.0	110.0	95.0	100.0	105.0
Europe:								
Greece	4.2	12.0	–	–	–	–	–	2.2
Yugoslavia	–	4.0	–	–	–	–	–	–
Bulgaria	1.4	[3] 1.6	1.7	1.3	.6	.5	.2	–
Estimated total	10.0	18.3	15.0	10.0	10.0	5.0	5.0	5.0
Soviet Union	[4] 8.0	[4] 16.0	–	–	–	–	–	–
Estimated world total	1,610.0	1,770.0	1,670.0	1,490.0	1,365.0	1,495.0	1,470.0	1,485.0

[1] 2-year average.

[2] 3-year average.

[3] 4-year average.

[4] Less than a 5-year average.

Compiled from official and trade sources.

Burma, Turkey, Manchuria, and Iraq, in the order mentioned, follow as ranking producers in Asia. The combined production of these countries, however, is only around 20 percent of that of China. In Burma, during 1945, the large decline in acreage of the early crop and low yields of both crops accounted for the small production of 40,000 short tons, compared with the prewar average of 56,000 tons. A large part of the Manchurian sesame crop in past years was exported to the Japanese Empire in the form of seed. Only a small quantity was retained for local oil consumption.

Africa

The output of sesame seed in Africa, though small in comparison with the world total, has been steadily increasing during the past 20 years. This crop is cultivated to some extent in about 12 African countries. The most important areas are in the Egyptian Sudan and Nigeria.

Western Hemisphere

The war stimulated a heavy increase in production of sesame in most producing countries of the Western Hemisphere. The total 1945 production was estimated at 105,000 short tons, which is three times the average output during 1935-39.

Mexico is by far the largest producer, with a crop in 1945 of about 88,000 short tons. Production has risen steadily from the 1930 level of 8,500 short tons to over 96,000 tons in 1942. The principal producing areas are concentrated on the Pacific coast, principally in the States of Guerrero, Sinaloa, and Michoacán. The average yield per acre of about 535 pounds is considered small in comparison with that of the Far East. Exports of sesame from Mexico have been insignificant in recent years in spite of increased output. The wartime shortage of fats and oils made necessary the local use of sesame for edible as well as for industrial purposes.

In Central and South America sesame production began in the late 1930's. Nicaragua produced around 3,700 short tons in 1945, and Guatemala about 3,000 tons. Smaller amounts were produced in Costa Rica and El Salvador. In South America, Colombia has made the greatest stride in sesame production, with a crop of about 4,000 short tons reported in 1945, compared with only a 300-ton average during the late 1930's. Although Venezuela's production of sesame has been on the increase, greater progress has been made in the introduction of new varieties. Other countries of the Western Hemisphere producing sesame in small amounts are Peru, Ecuador, Brazil, and the Dominican Republic.

Soviet Union

Production of sesame seed in the Soviet Union averaged about 8,000 short tons during 1927-29, when around 60,000 acres of land were under sesame cultivation. The acreage increased to approximately 150,000 acres in 1938. About 85 percent of this area was located in Soviet Central Asia, with the remainder in the Ukraine, Azerbaidzhan, and Krasnodar. Soviet trade in sesame seed has been negligible.

WORLD TRADE

International trade in sesame seed and oil has always been relatively small in comparison to production. World exports of sesame seed during 1935-39 averaged around 145,000 short tons (table 19), whereas sesame-oil shipments averaged only 10,000 tons. China was the principle exporter of seed; the Netherlands supplied over half the oil exports. The United States was the leading importer of both seed (table 20) and oil. Beginning in the late 1920's peanut oil became a competing commodity, and consequently the consumption of sesame oil was reduced in several countries, mainly in Europe. When supplies from China were shut off by the war, India and Nicaragua became the leading suppliers of sesame seed to the United States and Mexico the principal source of sesame oil.

Table 19. - *Sesame seed: Exports, by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
China	58.9	68.6	175.7	[1]20.3	–	–	–	–
Sudan	10.0	18.0	–	–	–	–	–	–
Manchuria	–	12.9	[1]11.0	–	–	–	–	–
India[2]	23.2	8.0	3.8	4.2	9.3	11.2	6.7	3.0
Netherlands Indies	4.9	3.9	3.2	2.5	2.0	1.5	1.0	.5
Tanganyika	3.8	5.0	–	–	–	–	1.8	–
Nigeria	3.6	11.7	–	–	–	–	–	–
Kenya	3.1	3.6	–	–	–	–	–	–
Turkey	–	2.5	9.2	–	–	4.4	–	–
Hong Kong	–	2.5	–	–	–	–	–	–
Belgium Congo	–	[3]1.0	–	–	–	–	–	–
Palestine	–	1.1	.2	(4)	(4)	(4)	–	–
Nicaragua	–	[3].5	(4)	.3	.9	4.2	1.7	–
Mexico	–	.2	2.8	4.0	4.3	1.0	2.0	3.0
Estimated world total	125.0	145.0	–	–	–	–	–	–

[1] January-August. [2] Including Burma up to March 1937. [3] 1939 only. [4] Less than 50 short tons.

Compiled from official and trade sources.

Table 20. - *Sesame seed: Imports, by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Italy	20.0	23.0	–	–	–	–	–	–
Japan	19.2	26.0	27.5	24.2	15.6	13.0	6.8	1.8
Netherlands	14.0	12.2	–	–	–	–	–	–
Germany	10.5	6.0	–	–	–	–	–	–
Egypt	10.0	14.0	–	–	–	7.0	1.1	.9
France	8.6	[1]1.3	–	–	–	–	–	–
British Malaya	3.4	4.0	–	–	–	–	–	–
Yugoslavia	[2]3.0	.5	–	–	–	–	–	–
United States	2.6	27.0	7.3	4.3	4.6	1.6	3.9	2.3
Ceylon	1.5	1.8	–	–	–	–	–	–
Bulgaria	1.1	[1].5	–	–	–	–	–	–
Zanzibar	1.0	1.2	–	–	–	–	–	–
Poland	–	[1]2.1	–	–	–	–	–	–
Estimated world total	115.0	135.0	–	–	–	–	–	–

[1] 4-year average.

[2] 3-year average.

Compiled from official and trade sources.

COPRA AND COCONUT OIL

SUMMARY

Production estimates and data relating to the area planted in coconut palms are quite incomplete. In some producing regions, figures have been published regarding commercial plantations, but data on native groves are extremely limited. The best index to the situation in copra and coconut oil, therefore, is gained by a review of the export trade.

During the period 1925-29, a total of 1,640,300 short tons of copra and coconut oil, in terms of copra, entered world trade annually from all producing areas, and during 1935-39 total exports increased by about 20 percent. In the latter period, total annual trade averaged 2,046,400 short tons of copra, of which 1,547,900 tons were of copra and 25 percent, or 498,500 tons, were of coconut oil expressed in terms of copra.

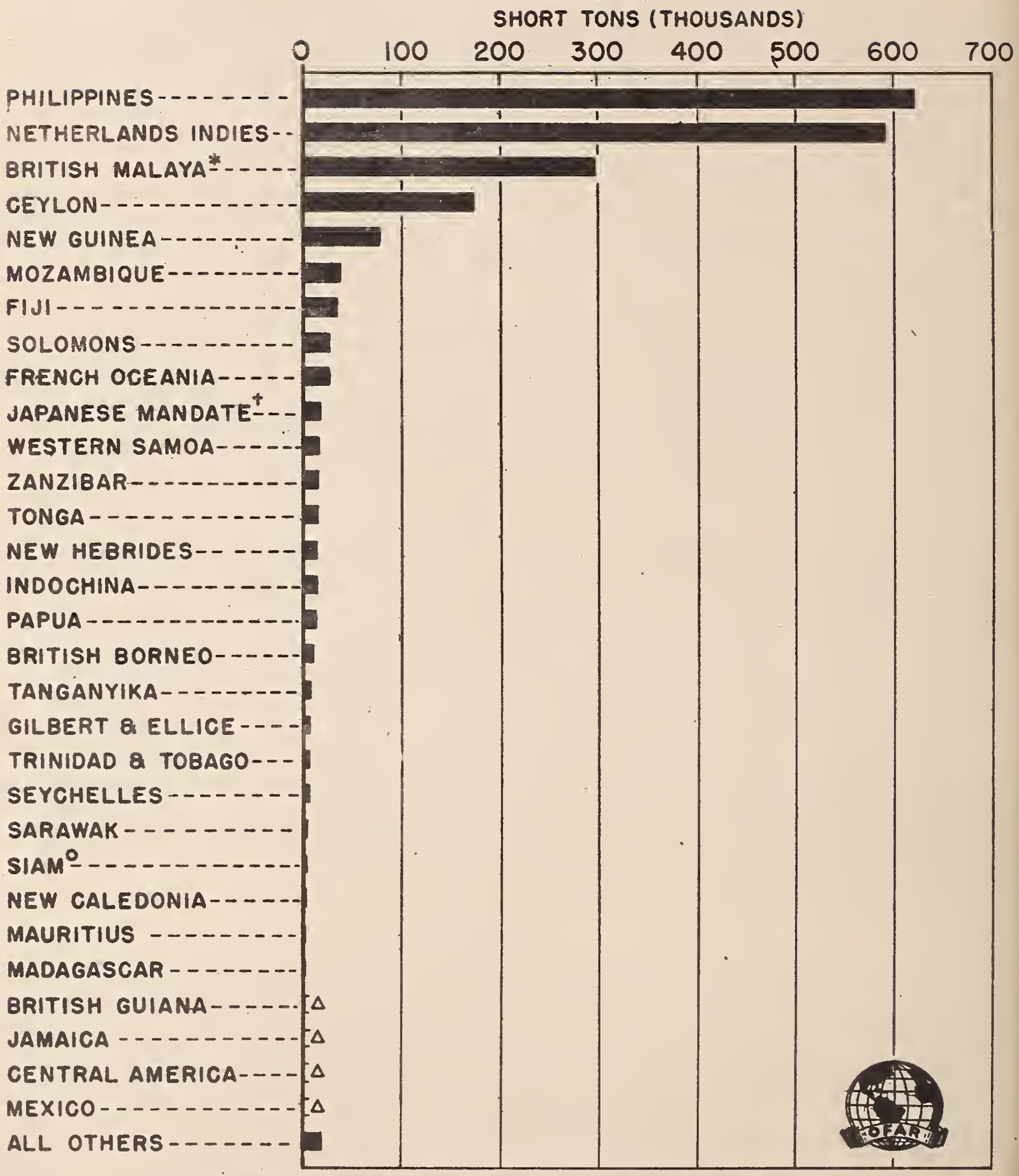
About 85 percent of all the copra and coconut oil entering international trade during the prewar years 1935-39 originated in the producing countries of Asia. In the order of their importance they were the Philippines, Netherlands Indies, Malaya, and Ceylon. Furthermore, these areas were the only exporters in volume of coconut oil. Another 11 percent of the trade came from the islands of the Southwest Pacific. Africa and the tropical countries of the Americas contributed the remainder. (See fig. 4.)

OUTLOOK

The 1946 outlook for copra and coconut oil is for gradually increasing supplies as a result of the liberation of the areas occupied by the Japanese. The total quantity entering international trade is expected to be about 35 to 40 percent of the prewar volume but 5 to 10 percent larger than 1945 exports. Shipments from the Far East, however, will be smaller than anticipated earlier. Exports of copra from the Philippines totaled only 9,000 tons in 1945. Future export prospects, however, are bright for this area, and a monthly export of 40,000 tons is expected during the latter half of 1946. Because of political disturbances in the Netherlands Indies, the world's largest producer of coconuts, exports from that area are expected to remain small for some months to come. Malaya may have resumed shipments during the summer of 1946. As transportation facilities become available, Oceania will regain its former position. No increase is anticipated in shipments from Africa.

BACKGROUND

The coconut palm *(Cocos nucifera)*, which is found growing in the tropical belt extending from between 20° and 25° north and south of the Equator, is the source of one of the ranking oil-bearing materials. Copra, which is the dried meat of coconuts, and which has an oil equivalent of about 66 percent, furnished about 20 percent of the total fats and oils entering international trade in prewar years. It is the source of coconut oil, which is widely used in both the industrial and edible fields. Because of its high lauric-acid content and quick-lathering properties, the largest prewar consumption was by the soap industry. The high melting point of the oil has made for extensive usage in confectionery, margarine, and bakery products. During the war, it was used as a plasticizer in various products and has been a necessary



*INCLUDES TRANSHIPMENTS OF COPRA FROM NETHERLANDS EAST INDIES

△LESS THAN 1000 SHORT TONS °FOUR-YEAR AVERAGE †THREE-YEAR AVERAGE

FIGURE 5.-Exports of copra and coconut oil, in terms of copra, from principal producing countries, average 1935-39 ingredient in the manufacture of synthetic rubber. Only small amounts of coconut oil have been used in shortening and virtually none in paints.

During the past 50 years a great expansion in the acreage of coconut palms has taken place, although plantings in the 1930's were confined principally to the Philippines and certain parts of New Guinea. The expansion resulted primarily from a demand in Europe and North America for coconut oil for use in the soap and margarine industries. The cost of the oil has been low enough to enable it to compete successfully with fats produced in countries of the Temperate Zones.

Coconuts are used in a multitude of ways by the natives of Asia and the Pacific islands. They serve as food, drink, and in making a fiber called coir. The palms, which are usually planted near villages, provide material for clothing, household equipment, and construction. Estimates are lacking regarding the domestic consumption of coconuts, but it is believed to represent, in most areas, at least 20 percent of the nuts produced.

Of all the copra produced, native groves furnish at least 85 percent, according to available data. On most of the islands of Oceania, they supply around 100 percent, in the Netherlands Indies 95 percent, and in Ceylon perhpas more than 50 percent.

GROWING CONDITIONS

As is characteristic of tropical plants, the coconut palm thrives in areas having a mean annual temperature of 72° F., or higher. Furthermore, it demands copious amounts of rainfall; an average of 40 inches well-distributed throughout the year is considered the minimum. In many of the best-known coconut countries, the average rainfall is double this amount. A circulating ground-water supply is another important requirement. Stagnant ground-water conditions cause harm to the palm and at times even kill it. Usually coconuts are planted on coastal areas where water from adjacent coastal ranges may percolate through the soil. Sections with similar conditions are found in some island valleys.

Generally, in well-cared-for plantations, coconuts come into bearing in the seventh or eighth year. Those planted around villages sometimes take as long as 10 or 15 years before they produce their first crop. Coconut trees will continue to bear well until they are 50 or 60 years old, after which time their yield decreases. Although the tree is called a centenarian, many palms die by the eightieth year. Since part of the palms are found in a semiwild state, yields per tree are low, probably averaging no more than 30 to 35 coconuts annually. On some of the well-kept plantations, yields as high as 60 to 70 nuts are not uncommon.

PRODUCTION BY REGIONS

Philippines

The Philippine Commonwealth was the world's leading exporter of coconut products in recent prewar years (table 21) and second only to the Netherlands Indies in production of these commodities. Annual exports during 1935-39 averaged 335,800 short tons of copra and 181,070 tons of coconut oil.

In 1938 there were about 139 million coconut trees in the Philippines, of which 60 percent were in bearing, 39 percent nonbearing, and about 1 percent tapped for tuba. Coconuts accounted for about 27 percent of the total cultivated area, being second only to rice. Coconuts are cultivated or collected in all the coastal areas

Table 21.- *Copra and Coconut Oil: Exports in terms of copra, by principal producing countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Asia:								
Philippines	449,200	623,300	702,200	[1]478,200	–	–	10,000	–
Netherlands Indies	463,600	593,300	318,100	[1]181,700	–	–	–	–
British Malaya . .	209,400	[1]298,500	–	–	–	–	–	–
Ceylon	183,300	171,700	146,300	169,800	172,800	250,700	239,300	[2]131,400
Indochina	12,100	12,000	–	–	–	–	–	–
Siam	11,600	[3]3,500	–	–	–	–	–	–
British Borneo . .	5,500	9,600	–	–	–	–	–	–
Sarawak	1,600	3,600	–	–	–	–	–	–
Others	1,900	5,000	–	–	–	–	–	–
Total	1,338,200	1,720,500	–	–	–	–	–	–
Southwest Pacific:								
New Guinea	57,900	77,500	66,500	–	–	–	–	–
Fiji	31,300	34,200	22,800	16,700	18,900	20,400	21,800	26,100
Solomons	24,200	25,400	24,600	–	–	–	–	–
French Oceania . .	15,300	23,800	7,100	15,200	16,700	19,000	–	–
Western Samoa . . .	15,100	14,000	14,000	6,300	–	–	–	15,000
Tonga	16,000	13,300	8,200	9,000	9,100	9,400	–	14,000
Japanese Mandate .	10,400	[4]15,200	–	–	–	–	–	–
New Hebrides . . .	11,100	13,000	14,500	–	–	–	–	–
Papua	11,000	11,900	–	–	–	–	–	–
New Caledonia . . .	5,200	3,300	–	–	–	–	500	–
Gilbert and Ellice	5,000	6,100	–	–	–	–	–	–
Others	27,000	4,200	–	–	–	–	–	–
Total	230,000	242,000	–	–	–	–	–	–
Africa:								
Mozambique	20,200	38,700	28,600	35,800	36,900	34,000	–	–
Zanzibar	18,200	14,000	10,400	12,000	14,500	11,600	16,000	–
Tanganyika	8,800	6,600	3,500	4,100	4,200	–	1,500	–
Seychelles	5,400	[3]5,400	–	–	–	–	–	4,400
Mauritius	1,300	1,700	–	–	–	–	–	–
Madagascar	1,300	1,000	–	–	–	–	–	–
Others	4,800	8,400	–	–	–	–	–	–
Total	60,000	75,800	–	–	–	–	–	–
Western Hemisphere:								
Trinidad and Tobago	8,200	5,600	–	–	–	–	–	–
British Guiana . .	2,500	800	–	–	–	–	–	–
Jamaica	400	500	–	–	–	–	–	–
Central America .	1,000	400	–	–	–	–	–	–
Mexico	–	100	–	–	–	–	–	–
Others	–	700	–	–	–	–	–	–
Total	12,100	8,100	–	–	–	–	–	–
World total	1,640,300	2,046,400						

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[1] Includes transshipments of copra from Netherlands East Indies.

[2] January through September.

[3] 4-year average.

[4] 3-year average.

Compiled from official and trade sources.

of the islands, except on Luzon north of Manila and on several small islands in the west central part of the archipelago. Southern Luzon, especially in the southeastern part, accounted for 44 percent of the total copra production in 1938. Production on Mindanao in the same year contributed 23 percent of this total. The ports of Manila and Cebu had all the crushing plants before the war. These plants were damaged during the war, but restoration work is now in progress. About 75 percent of all the Philippine copra was collected at these two ports, where it was exported, processed, and distributed, both locally and for exportation.

The 1934-38 production of copra averaged 653,650 short tons, of which about 70 percent was smoked-dried, 29 percent sun-dried, and 1 percent mechanically dried. Generally speaking, the smoked-dried Philippine copra was considered of low quality in comparison with the sun-dried and kiln-dried copra produced elsewhere. At the present time, estimates indicate that the potential Philippine copra production, if realized, would amount to approximately 850,000 tons. Coconut production in 1939 totaled around 2.3 billion nuts and probably is larger now.

In prewar years, about 225,000 tons of coconut oil were produced, of which 80 percent was exported, mostly to the United States.

Domestic consumption of fresh coconuts reached a prewar peak of 759 million nuts, or about 25 percent of the total production. Local consumption of home-made and factory-produced coconut oil, estimated at 4,700 tons (1937) and 52,000 tons (1938), respectively, exceeded all previous records, but it represented, in terms of copra, only about 12 percent of the annual production.

In 1941, preceding the Japanese invasion, copra production was at a high level. Stocks in December 1941 apparently were larger than normal as a result of this high production and a shortage of ships for transportation.

In early 1942, production of copra was negligible. Active military operations, large stocks, and absence of a market, as well as Filipino resistance to the Japanese, almost completely paralyzed the industry. In June 1942, the Japanese established a copra-control agency and pegged the price at 6.50 pesos (Japanese) per 100 kilos (220 pounds), delivered at any marketing place. There was some production under this program in the second half of 1942, but indications are that the total for the year was not more than 150,000 tons.

For 1943, the output of copra is estimated at less than 100,000 tons. This decline was caused by the rapid drop in purchasing power of the Japanese peso, particularly in the latter part of the year. In early 1944, the Japanese endeavored to offset this by raising the price to 15.00 pesos, but inflation had progressed so far that this price likewise failed as an incentive to production. Estimates of 1944 output were placed at from 50,000 to 60,000 tons.

When United States forces entered the Philippines in late 1944, the copra industry was in a state of abandonment. Production capacity existed in the form of coconut trees bearing nuts, but practically every facility for harvesting, copra making, and marketing had been destroyed. When major military operations ceased in April 1945, the copra areas had no bags, trucks, work animals, ships, warehouses, communications, or credit. Tenants and laborers were destitute, and in many cases they had drifted away to other work, or were engaged in guerrilla warfare.

Following the liberation of the Philippines in 1945, a semigovernmental agency, called the Copra Export Management Company, was formed to obtain needed copra supplies. Incentive goods, transportation, warehouse facilities, and bagging material were needed before shipments could be made. In 1945, only 9,000 tons of copra were exported.

Since January 1946, shipments have been increasing and may reach 40,000 tons monthly during the year.

The situation regarding the export of coconut oil is not so bright. Much work is still needed to repair the crushing mills. Under the Philippine Trade Act a decreasing quantity of Philippine coconut oil may be imported duty-free into the United States after 1954, while copra imports will continue free in unlimited quantities.

Netherlands Indies

The Netherlands Indies is considered to be the world's largest producer of coconuts. While no official estimates are available for the total amount of copra produced, in prewar years the annual output was apparently around 1.3 million short tons. Plantation production furnished only 36,800 tons of this total. All the remainder originated from native output.

Estate cultivation of coconuts is limited, since the average size of plantations is less than 200 acres. It is centered chiefly in the Menado Residency and the Moluccas. About 80 percent of the plantation area in the Outer Provinces is planted exclusively with coconuts, but in Java the majority of the plantations are interplanted with other crops, chiefly kapok. In 1939, a total of 15,800 acres were under cultivation in Java and Madura and in the Outer Province a total of 106,900 acres.

In Western Borneo, the Celebes, and Sumatra, native cultivation of coconuts is of prime importance. Makassar in the Celebes is the most important concentration center. Javanese producers sold most of their copra to local oil mills, and in the Outer Provinces most of the copra went directly to international markets.

Coconut oil was produced in the Netherlands Indies both in mechanically operated mills and by primitive native methods. In 1939, there were 69 mills, which produced 201,300 tons of coconut oil. The plants in Java and Madura produced 84 percent of the total output. The 1933-39 annual export of coconut oil averaged 15,800 short tons, all of which was factory oil.

In addition to the factory-produced oil, very large quantities are produced in villages for local consumption. In prewar years, the natives of Java were estimated to have consumed nearly 300,000 tons of coconut oil from their own village mills. In the Outer Provinces; consumption of village oil was believed to be around 150,000 tons.

Accurate information about present-day conditions of the industry are not available. Many of the plantations and native groves are reported to be covered with underbrush and small coconut palms sprouted from fallen nuts. Despite political disturbances, there appears to be a possibility of reestablishing the copra trade fairly soon in certain of the Outer Provinces. Some time may elapse, however, before coconut products again move in volume. Before the war, copra exports alone represented around 55 percent of all the fats and oils shipped from this area.

Malaya

In 1940, 616,500 acres were estimated to be under coconut cultivation in Malaya. Of this total, 289,000 were in the Unfederated Malay States (chiefly Johore), 252,300 in the Federated Malay States (Perak and Selangor), and 75,200 in the Straits Settlements. Only about 20 percent of the total acreage was thought to be in plantations.

Commercial copra production during 1935-39 was believed to average around 225,000 tons a year. In addition to the commercial copra and coconut oil, there is also a considerable native production of these commodities. A total of 11 oil mills produced the commercial output of coconut oil in Malaya.

For soap manufacture, about 8,500 to 10,000 tons of unrefined coconut oil were consumed. For food purposes, the Chinese of this area preferred coconut oil mixed with peanut oil, and the native population consumed coconut oil without mixture.

The annual consumption of fresh nuts and coconut oil was estimated at around 90,000 tons, copra equivalent. Local consumption of copra cake as an animal feedstuff reached approximately 30,000 tons.

Before the war, copra exports were diminishing and coconut-oil exports increasing, owing to the development of the local crushing industry.

In considering the gross exports from Malaya, one must take into account the fact that Singapore was a reshipment port for a large tonnage of copra from the Netherlands Indies. Thus, in the yearly exports before the war, Malaya-produced copra constituted only from 30 to 40 percent of the total. The 1935-39 gross exports of copra averaged 214,700 tons, and shipments of coconut oil for the same period averaged 52,800 tons.

Ceylon

Ceylon, one of the oldest and best-known coconut-producing areas of the world, was the principal source of copra and coconut oil for the United Nations during the war. In 1944, Ceylon supplied about 55 percent of the total imported by the United Nations and neutral countries.

The commercial coconut industry of Ceylon had its beginning about 1840, when European planters began to set out sizable acreages. By 1860, an estimated 280,000 acres had been planted; by 1890, approximately 750,000; and, by 1905, about 990,000 acres. During the past decade there has been practically no new planting.

Total copra production in 1944 was estimated at 228,000 short tons, compared with about 300,000 tons in 1943. Approximately 35,000 tons of copra were utilized domestically in 1944, which yielded about 22,000 tons of coconut oil. This was a little larger than the amount consumed in 1943. Domestic consumption of coconut oil was about 31 percent of all the oil produced in 1944. Approximately one-half of the 1944 copra production was crushed for oil, and the remaining amount was exported as copra. Total domestic consumption of coconuts for food and oil is currently about one billion nuts yearly, or more than 55 percent of the coconuts produced. The prewar average was about 40 percent of the total production.

Production of coconuts in Ceylon has been declining slowly for the past decade. Growing senility of palms, failure to replant, and limited use of fertilizers, especially in the past 5 years, are reported to be the contributory causes. Ceylon, however, is generally considered to be the model coconut-producing country, since some of the most advanced methods of cultivation are employed there. Accurate data relative to acreage are not available; however, the consensus is that Ceylon has about 1.1 million acres planted to coconuts, or about 12 to 14 percent of the total world area commercially producing this crop. The 1944 yield per acre was estimated to have averaged about 1,800 coconuts. During the 1930's, the number of coconuts produced was believed to have fluctuated from about 2 to 2.2 billion, with the lower figure occurring toward the end of that period. In 1944, production was estimated at 1.9 billion nuts and in 1945 at slightly less. The outturn in the late fall of 1945 was adversely affected by a prolonged drought in the previous spring, and a reduced output was also expected during the spring months of 1946.

Southwest Pacific

From 1935 to 1939, the islands of the Southwest Pacific, excluding the Philippines, exported about 242,000 tons of copra yearly, or about 13 percent of the total amount of copra entering international trade. Areas accounting for approximately 135,000 tons, or about 60 percent of the amount formerly exported, fell into Japanese hands when they occupied five important island groups in 1942.

Southwest Pacific copra is generally of poor quality. Mold is common because of improper drying. In normal times, it sells on the world market at prices considerably lower than those paid for top grades from Ceylon. Most of it is sun-dried, but before the war the use of kilns was increasing. By far the largest portion of the copra is produced by natives. A number of European-directed plantations were operated, however, in Fiji, the Solomons, the Territory of New Guinea, and in French Oceania.

The coconut industry is not diversified as it is in Ceylon, where desiccated coconut, coir, and copra cake are important byproducts. No coconut oil is exported.

The Mandated Territory of New Guinea is the single most important producing region, and during 1935-39 its exports of copra averaged 77,500 tons a year. Not only is New Guinea the largest producer, but the copra it ships is also of the best quality, according to general opinion. Exports are closely supervised to ensure a standard grade. The chief concentration point for shipment is Rabaul, and copra from this Territory is designated by that name. The area under cultivation in 1940 totaled about 265,000 acres, but many trees were not yet at the bearing stage. Should the present strong demand for copra continue, large areas of land are available to expand plantations.

The plantations, however, suffered greatly from Japanese occupation. Practically all their buildings and materials are reported to have disappeared. Owners are now returning to some of those not in use for other purposes, and the New Guinea Production Control Board has inaugurated a vigorous effort to provide the greatest quantity of copra in the shortest possible time. From July 1945 through January 1946, about 3,500 tons of copra are reported to have been exported, and about 3,300 tons were said to be on hand in the Territory, two-thirds being scheduled for shipment in May.

About 250 islands make up the Crown Colony of Fiji. The 1935-39 exports from this area averaged 34,200 tons a year. About one-half the copra exported originated on plantations, and the remainder came from native groves. The Islands of Tavenuni, Lau, and Vanua Levu accounted for over 75 percent of the total production. The yield per acre averaged around 675 pounds. Fiji, unlike many of the other island groups that rely solely on the export of copra for economic livelihood, has a more diversified agriculture. It produces sugar, bananas, pineapples, livestock, and a small amount of cotton.

In the British Solomon Islands Protectorate the plantation-coconut industry was begun in the early part of this century and is the only one of importance. In 1940 the number of acres under cultivation totaled 63,000, of which Ysabel, New Georgia, and Guadalcanal together had about 80 percent. On some of the best plantations copra yields per acre ran from 1,100 to about 1,700 pounds.

From the Gilbert and Ellice Islands only about 6,100 tons of low-grade copra were exported annually before the war. In this group all the coconut land is in the hands of natives, except for foreign-owned plantations on Christmas, Washington, and Fanning Islands. The total area under coconut cultivation was reported to be around 20,000 acres, and the average yield of copra per acre, only 600 pounds.

In the island group of Tonga, the only crop of importance is copra. Coconuts are used extensively for cooking and eating purposes and as feed for livestock and poultry. Commercial coconut plantations do not exist. Prewar exports of copra from Tonga averaged about 13,300 tons.

In Papua, which is situated in the southeastern half of New Guinea, approximately 45,000 acres of coconuts were under commercial cultivation in 1940. In addition, natives were required to plant coconuts for their own supply. The plantations were not overrun by the Japanese but suffered much damage from wartime activities. Production for the year ending June 30, 1946, was estimated at about 11,000 tons as compared with around 14,000 in 1936-37. Most of the copra from this area moved to Australia before the war, and exports averaged about 11,900 tons a year during 1935-39.

From the condominium of the New Hebrides, annual copra exports averaged 13,000 tons for the 5-year period 1935-39. As on the Fiji Islands, the agriculture is more diversified, and some quantities of cocoa, coffee, sandalwood, and cotton, are produced in addition to coconuts.

From 1935 to 1939, the islands of French Oceania shipped a yearly average of about 23,800 tons of copra. The annual yield of coconut per tree in the colonies averages from 25 to 30 nuts. The general belief is that not more than two-thirds of the total production is harvested during normal times. The remainder of the nuts rot, or rats destroy them. Most of the copra is produced by natives, whose plantations are less than 25 acres in size.

The Japanese Mandated Islands of the Pacific, consisting of the Marianas, Carolines, and Marshalls, exported an average of 15,200 tons of copra per year before the war. The production of commercial copra during 1935-39 averaged 16,200 tons.

Latin America

On the basis of available information, copra production in the Americas appears to be currently averaging around 75,000 or 80,000 short tons yearly. This constitutes an increase of some 25,000 tons over the production level of 1939. The expansion has come about less through the efforts of the various governments to foster production than by the stimulation given the industry by favorable prices and rising demand caused by the loss of former sources of copra supplies as a result of war.

The Republic of Mexico is the most important producer of copra in the Western Hemisphere. Production increased from 18,500 tons in 1939 to an estimated 40,000 tons in 1945. The most important producing States are Guerrero and Colima on the Pacific coast and Campeche and Tabasco on the eastern coast. Copra production is expected to continue to increase slowly for a number of years to come. In addition to being the largest producer, Mexico is also the largest Latin American importer of copra.

Trinidad and Tabago, islands of the British West Indies, appear to constitute the second most important copra-producing area. Estimates indicate that about 11,000 to 12,000 tons of copra are being produced annually on these islands at the present time. A period of drought in 1940 and 1941 caused some lowering of output, and since that time shortages of labor have hindered production somewhat.

Jamaica is another ranking producer of copra and has a current yearly production of some 8,000 to 9,000 tons. Jamaica, however, is better known as a shipper of fresh coconuts. About 90 million coconuts are believed to have been harvested annually before 1944. In that year, the industry suffered a setback when a tropical hurricane seriously damaged coconut plantings; some reports indicate that 40 percent of the trees were injured.

Panama produced about 2,500 tons of copra in 1945, according to available information. The construction of a vegetable-oil plant in 1938 helped to bring about a greater demand for domestic copra. The main centers of production are on the Gulf of Montijo on the Pacific side and the Bocas del Toro and San Blas sections on the Caribbean side of the Isthmus.

The Bay Islands lying off the Coast of Honduras are the center of production in that country. Coconuts are also produced, but in smaller numbers, in the region adjacent to La Ceiba. Most of the Nicaraguan copra output, which has shown considerable increase since 1941, comes from the Corn Islands.

Copra output in Ecuador is estimated at 400 tons yearly. Some expansion in coconut production has taken place, but many of the coconut lands still remain undeveloped. The center of production is located around the small island group of San Andres, and a good portion of the copra is processed near Barranquilla.

The number of coconut trees in Brazil is variously estimated at from 5 to 6 million. Few of the coconuts are dried for copra; the bulk are consumed fresh for the milk and the meat. Officially reported coconut-oil production amounted to 3,015 tons in 1944 as compared with 2,620 in 1943 and the 10-year average of 1,325 tons. The States of Sergipe and Baía supply the largest quantities.

Relatively few cultivated plantations of coconuts are found in the Americas; most of the coconuts are harvested from wild trees. In comparison with other producing regions, the yield of nuts is low, averaging probably no more than 30 per tree annually. Bud rot, scale insects, and nematodes have caused considerable trouble in the Caribbean area.

Trade in copra and coconut oil among the various Latin American countries during prewar years was very limited. The intercountry trade has shown no marked trend, since movements for the most part are sporadic in nature. The Islands of Trinidad and Tobago, the Republics of Paraguay and Honduras, and British Honduras have been among the principal exporters of these commodities.

Africa

In Africa most of the copra is produced on the eastern coast from Tanganyika south through Mozambique. Smaller quantities are produced in the British and French colonies of West Africa, but both peanuts and the oil palm are more important sources of oil.

Copra ranks third in value among the exports from Mozambique in Portuguese East Africa. While coconuts are grown throughout the coastal area, cultivation on a large scale is chiefly concentrated in the Quelimane district of the Zambezia Province. This area produces 90 percent of the output of the colony. It is estimated that there are over 5 million palms in Zambezia. A total of 141,600 acres of coconut palms for all of Mozambique was reported in 1941. Annual coconut production is believed to be around 155 million nuts. Copra production during 1935-39 averaged 42,000 tons per year, and the output is believed to have increased slightly in more recent years. Exports for the 5-year period 1935-39 averaged 38,100 tons.

In Kenya, Tanganyika, Nairobi, and Zanzibar of British East Africa, commercial production of copra totals around 30,000 tons yearly. Production in Tanganyika is about 10,500 tons. On the Island of Zanzibar, the copra output in recent years has amounted to about 15,000 tons. The annual copra output on Madagascar averaged 2,500 tons in prewar years and reached 4,235 tons in 1945.

IMPORTS

During the prewar years, the United States was the largest importer and consumer of both coconut oil and copra (table 22). During 1935-39 annual imports of copra averaged 229,800 short tons, and coconut-oil imports, 171,400 tons. All the coconut oil came from the Philippines because of favorable tariff arrangements. The soap industry utilized about two-thirds of the United States coconut-oil consumption. Because of the Federal excise tax of 3 cents a pound on the first domestic processing of the Philippine product, the tax of 5 cents a pound on foreign coconut oil, and the tax in many States on margarine containing imported oils, the use of this oil in edible products decreased materially after 1936.

In general the European countries preferred to import copra instead of coconut oil and made extensive use of copra meal as livestock feed. In the prewar years, Germany was the largest single importer, followed by France, Great Britain, Denmark, and the Netherlands. In addition to crushing copra for domestic use, the Netherlands, Denmark, France, and Germany exported oil to other European nations. In France, most of the coconut oil was utilized in soap making. In the Scandinavian countries this commodity was widely employed in the manufacture of margarine, vegetable-oil compounds, and other edible products, as well as soap.

Among the Latin American countries, Mexico has been the ranking importer of copra; during the 5-year period 1935-39, its annual imports averaged 47,000 tons. In 1941, a record total of almost 100,000 tons entered the Republic. Imports by other Latin American countries have been much smaller, ranging from less than 500 to about 8,000 tons. All these countries use coconut oil mostly for edible compounds and soap.

Table 22. - *Copra and Coconut Oil: Imports in terms of copra, by selected countries, averages 1925-29 and 1935-39, annual 1940-45*

CONTINENT AND COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
North America:								
United States	468.6	501.8	601.9	606.5	105.4	152.7	135.8	145.3
Canada	.6	29.4	40.4	50.2	34.7	11.4	19.8	26.1
Mexico	–	47.4	73.1	99.8	14.3	1.2	.3	–
Total	469.2	578.6	715.4	756.5	154.4	165.3	155.9	171.4
South America:								
Argentina	2.8	3.2	2.0	2.6	3.5	1.0	1.4	–
Colombia	–	9.0	7.4	9.9	3.2	.9	–	–
Venezuela	–	(1)	(1)	3.3	.1	2.1	–	–
Uruguay	.4	1.1	2.2	–	–	–	–	–
Chile	[2] .3	[2] 2.0	2.5	–	.4	–	–	–
Total	3.2	13.3	11.6	15.8	6.8	4.0	1.4	–
Europe:								
Germany	230.2	[2]221.3	–	–	–	–	–	–
France	190.5	[2]159.7	–	–	–	–	–	–
United Kingdom	146.7	175.0	162.8	135.2	59.8	78.9	38.1	86.7
Netherlands	161.9	83.0	–	–	–	–	–	–
Denmark	82.9	93.0	27.0	.6	–	–	–	–
Belgium-Luxemburg	[1]36.3	21.5	–	–	–	–	–	–
Norway	21.8	42.2	–	–	–	–	–	–
Poland	[1]29.5	[2] 2.0	–	–	–	–	–	–
Sweden	38.1	[2]105.5	[1] 42.9	.7	19.5	13.7	–	–
Italy	30.7	34.6	12.3	.8	–	–	–	–
Austria	14.4	[2] 13.4	–	–	–	–	–	–
Finland	9.0	12.3	–	7.5	– –	–	–	–
Czechoslovakia	24.4	[2] 12.3	–	–	–	–	–	–
Total	1,016.4	975.8	82.2	9.6	19.5	13.7	–	–
Grand Total	1,488.8	1,567.7	–	–	–	–	–	–

[1] Coconut oil is reported with other oils. [2] Less than a 5-year average.

Compiled from official sources.

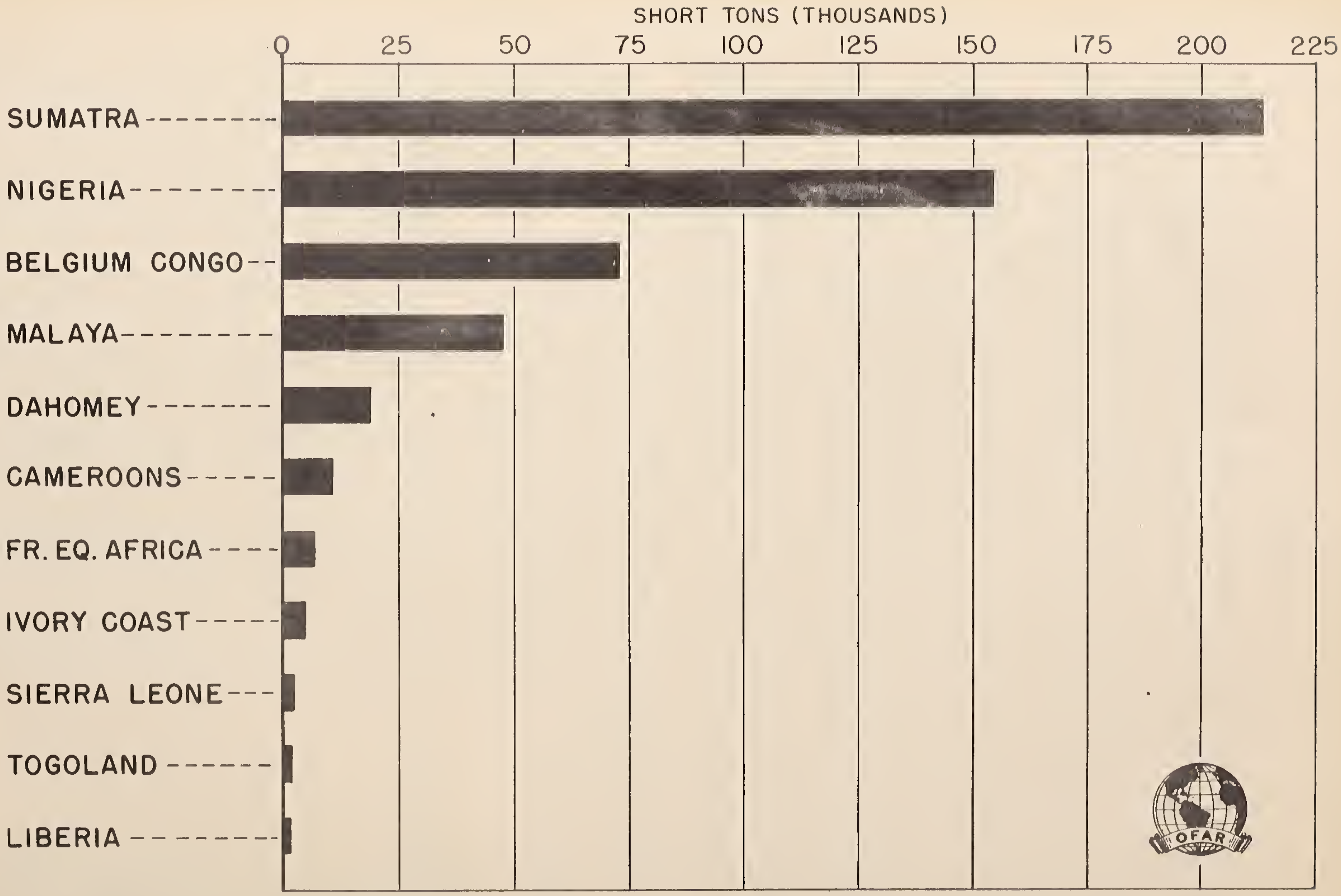


FIGURE 6.-Exports of palm oil from principal producing countries, average 1935-39

PALM AND PALM-KERNEL OILS

SUMMARY

The 1946 exports of palm oil are expected to reach 265,000 short tons as compared with the average 1935-39 shipment of 535,400 tons a year. World exports of palm kernels may total about 550,000 tons, compared with the prewar average of 760,000 tons. (See tables 23 and 24.) The greater part of both commodities will be produced and exported from Africa, with the Far East accounting for minor quantities.

Table 23.- *Palm Oil: Exports from principal producing countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Africa:								
French:								
Dahomey	16,800	18,800	10,900	14,000	–	–	–	–
Ivory Coast	7,900	4,500	6,400	2,900	–	–	–	–
Senegal	–	(1)	–	–	–	–	–	–
French Guinea	–	300	200	(1)	–	–	–	–
French Equatorial Africa .	–	6,700	–	4,100	1,700	3,300	2,300	2,000
Total	–	30,300	–	–	–	–	–	–
British:								
Nigeria	137,400	154,400	146,000	143,100	–	–	–	–
Sierra Leone	3,300	2,000	–	100	–	–	–	–
Gold Coast	1,200	600	–	400	–	–	–	–
Total	141,900	157,000	–	–	–	–	–	–
Belgium Congo	23,600	73,000	56,208	67,000	–	–	–	84,800
Mandates:								
Cameroons	6,700	10,500	–	8,000	1,300	7,100	5,200	4,300
Togoland	–	1,900	800	2,600	1,700	300	1,300	700
Liberia	–	1,500	–	–	–	–	–	–
Asia:								
Sumatra	22,100	213,700	196,100	–	–	–	–	–
Malaya	1,600	47,500	62,800	–	–	–	–	–
Total	–	535,400	–	–	–	–	–	–

[1] Less than 100 tons.

Compiled from official and trade sources.

An appraisal of the present world situation of palm oil and kernels is difficult to make; production estimates are lacking, except for Sumatra and Malaya which are available only for prewar years. Most of the output in Africa comes from wild trees, and unknown amounts are consumed domestically. The best index as to the importance of these commodities is derived from the quantities entering international trade, but data since 1939 are limited. (See fig. 6.)

Africa, especially the western coast, is the world's leading producing region for both palm oil and palm kernels. In prewar years the various French and British colonies exported about 52 percent of the palm oil entering world trade and about 95 of the palm kernels. Developments in recent years have been obscure, but probably the production of palm oil in British West Africa averaged around 90 percent of the prewar output. The 1945 production in the Belgian Congo exceeded the prewar level. Palm kernels, being bulk cargo, may have declined in output, since there were priorities

Table 24.- *Palm Kernels: Exports from principal producing countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Africa:								
French								
Dahomey	44,600	56,700	38,900	39,700	–	–	–	–
Ivory Coast	14,200	10,300	–	–	–	–	–	–
Senegal	3,300	2,700	–	–	–	–	–	–
French Guinea	13,000	17,500	5,700	5,200	–	–	–	–
French Equatorial Africa .	9,600	12,900	–	8,800	7,100	9,100	10,700	10,000
Total	84,700	100,100	–	–	–	–	–	–
British:								
Nigeria	284,500	371,400	186,300	415,900	–	–	–	–
Gold Coast	7,400	7,800	–	3,700	–	–	–	–
Gambia	800	800	–	530	–	–	–	–
Sierra Leone	71,300	88,300	–	40,900	–	–	–	–
Total	364,000	464,300	–	–	–	–	–	391,400
Belgium Congo	83,500	95,600	47,200	33,000	–	–	–	47,800
Mandates:								
Cameroon	37,900	40,700	–	–	–	–	–	–
Togoland	8,900	15,000	–	12,800	8,000	10,900	10,300	8,100
Liberia	[1]9,200	11,000	–	–	–	–	–	–
Asia:								
Sumatra	4,300	25,100	–	–	–	–	–	–
Malaya	200	8,100	10,300	–	–	–	–	–
Estimated world total	592,700	759,900	–	–	–	–	–	–

[1] 3-year average.

Compiled from official and trade sources.

on shipping space. In the French areas, the output of these commodities appears to have been much further reduced. In addition to the lack of trade goods, difficulties in maintaining and replacing equipment, and irregular transportation facilities, which hindered the industry in all areas, there were political disturbances in French West Africa to overcome. Despite these problems, Africa was the leading source of tropical oils for the United Nations during the war. Its resources were particularly valuable in filling the gap caused by the loss of the Far Eastern palm and coconut oils after the Japanese invasion.

Sumatra and Malaya in the Far East, the only other producing areas of any importance, were only recently liberated, and as yet prospects for export from them have not been determined. Of the two, Sumatra is the larger producer, but it will not be in a position to ship until political disturbances are settled and processing equipment is again repaired or replaced. Malaya was expected to be able to export small quantities of palm kernels and palm oil by midsummer of 1946, but when it can return to full production is unknown. Prior to the Japanese occupation, these areas exported a total of about 33,000 short tons of palm kernels and about 261,000 tons of palm oil, of which almost 80 percent came from Sumatra - the largest single producer of palm oil during 1935-39.

OUTLOOK

Africa probably will reach, if not surpass, its prewar exports in the near future. On the other hand, apparently several years may elapse before the Far Eastern exporters regain their previous position in international trade.

TYPES AND USES

Palm oil is obtained from the fleshy pulp of the palm-fruit pericarp, which consists of numerous cells rich in oil and surrounded by a fibrous material. The color of the oil ranges from amber to dark red. In crushing, the first drops of oil are practically colorless, and then it usually becomes red because of the presence of carotene. The hardness of the oil varies from that of butter to that of tallow. The greater the percentage of fatty acids the harder is the oil. Oil extracted by crude native methods not uncommonly has a fatty-acid content of 50 percent or even higher, whereas the oil prepared by modern crushing plants from selected fruits usually has less than 5 percent.

Palm oil is widely used in the manufacture of soap and also in the tin-plate and candle industries. Its use in edible products was expanding before the war, and sizable quantities were utilized in the manufacture of margarine and shortening. In the producing areas, natives have used it for centuries for soap and culinary purposes. During the wartime scarcity of petroleum in Africa, a motor fuel for cars and trucks contained a certain percentage of palm oil. The United States is a heavy importer of palm oil, and during 1935-39 the United Kingdom was the largest European market. (See table 25.)

The oil obtained from the kernels has properties quite distinct from those of oil obtained from the outer pulp. The kernel oil is a lauric-acid type, with an oil content of about 50 percent, and is similar to coconut oil. Only small quantities of kernels have been crushed in Africa or the Far East; most of the output before the war was bagged and shipped to Europe for crushing. (See table 26.) The oil is largely used for edible purposes but also for soap making.

PRODUCTION BY REGIONS

Africa

The oil palm *Elaeis guineensis* is indigenous to West Africa and grows from Gambia to Angola. It is most prolific in the coastal areas and rarely grows more than 200 miles inland, where the climate becomes drier and rocky soils occur. It is most abundant where moist soil conditions exist, but ground-water supplies must not be stagnant.

Among the numerous varieties, many differences occur both as to the quality and and quantity of fruit produced. The variation is reported to be greater than 30 percent. Some of the fruits have thin pericarps, yielding less palm oil and more palm kernels, and vice versa. The improved varieties, such as found in the Belgian Congo, Malaya, and Sumatra, have a pulp content of about 75 percent, with about 50 to 60 percent oil.

The African palm-oil and palm-kernel industry is based almost entirely upon the collection of nuts from trees growing wild on farm lands and in secondary brush. There are literally millions of trees available for exploitation, but to date only a small percentage have been utilized. When the bunches of nuts ripen, they are harvested by natives. Thus far, the industry has not been modernized to any extent. Except in the Belgian Congo, few plantations have been established. The palm oil produced before the war was generally of poorer quality than that from the modern plantations of Sumatra and Malaya. A large portion of the African oil is extracted by crude and wasteful methods and is usually high in free fatty acids. In more recent years, however, large private companies have established modern refineries and the quality of the oil has improved. The improvement resulted, in part, from the rapidly

Table 25.- *Palm Oil: Imports by selected countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRIES	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Europe:								
Germany	[1] 21,800	[2] 40,900	-	-	-	-	-	-
Austria	[1] 2,700	[2] 2,200	-	-	-	-	-	-
Belgium and Luxemburg	7,900	19,500	-	-	-	-	-	10,900
Bulgaria	[1] 1,400	100	-	-	-	-	-	-
Denmark	[1] 600	700	-	-	-	-	-	-
Spain	[1] 300	[3] 500	100	2,000	-	2,300	300	100
Estonia	200	[2] 100	-	-	-	-	-	-
Finland	[1] 700	600	-	-	-	-	-	-
France	15,100	[2] 32,100	-	-	-	-	-	-
Greece	[1] 100	(4)	-	-	-	-	-	-
Hungary	[1] 2,300	100	-	-	-	-	-	-
Iceland	[1] 1,400	[2] 2,400	-	-	-	-	-	-
Italy	19,600	[2] 39,900	10,800	300	-	-	-	-
Latvia	(4)	[2] 200	-	-	-	-	-	-
Lithuania	-	(4)	-	-	-	-	-	-
Norway	[1] 900	500	-	-	-	-	-	-
Netherlands	12,700	33,000	-	-	-	-	-	-
Poland and Danzig .	[1] 18,600	[2] 1,000	-	-	-	-	-	-
Portugal	[1] 3,800	4,700	-	5,400	3,000	2,500	-	-
Rumania	[1] 200	100	-	-	-	-	-	-
United Kingdom . .	73,600	123,900	209,000	240,900	239,000	225,800	208,000	131,500
Sicily	[2] 3,500	400	-	-	-	-	-	-
Sweden	1,200	[2] 1,700	1,900	400	100	-	-	-
Switzerland	[1] [2] 3,300	[1] [2] 7,500	-	-	-	-	-	-
Czechoslovakia . .	1,400	[2] 3,900	-	-	-	-	-	-
Yugoslavia[1]	2,300	400	-	-	-	-	-	-
Total	195,600	316,400	-	-	-	-	-	-
North America:								
Canada[3]	700	31,700	34,400	35,100	6,200	11,900	8,600	14,800
United States[5] . .	86,100	160,700	113,400	154,100	38,900	29,800	35,700	33,100
Total	86,800	192,400	-	-	-	-	-	-
Grand Total	282,400	508,800	-	-	-	-	-	-

[1] Includes coconut oil.

[2] Less than 5 years.

[3] 1 year only - 1939.

[4] Less than 100 tons.

[5] Imports for consumption, beginning 1934.

Compiled from official and trade sources. Where weight of container was not given, 15 percent was deducted from gross weight.

increasing competition with the Far East. The various agricultural departments of the colonies have made efforts to select high-yielding varieties of palm and have encouraged natives to remove the older nonproductive trees and plant selected varieties. However, much remains to be done.

Except for a few scanty unofficial estimates on production of palm oil and palm kernels, little is known about the actual quantities produced, and estimates on the volume of palm oil consumed within the colonies vary. From 20 to about 50 percent of the total production is, however, believed to be utilized domestically and in some areas considerably more. Palm oil holds an important place in the dietary scheme of the natives and moves to nonproducing areas within the colonies. Likewise, a significant percentage of this commodity is used in the making of soap.

Nigeria is the most important single African producer of both palm kernels and palm oil. Production is mainly concentrated in the southern and southeastern Provinces. Except for a few plantations owned by Europeans, practically all the production is from wild palms. In 1938, production of palm oil was reported to have approximated 350,000 tons; total exports for the same year were placed at 110,400 tons. If these figures are indicative of the average export-domestic consumption relationship, then around two-thirds of the annual output is for home use. In recent years, increasing quantities of this commodity have moved to the northern nonproducing parts of Nigeria for consumption.

The Belgian Congo has been the leader in establishing modern plantations. One source has estimated that by 1945 more than 75,000 acres of modern plantings had been set out. A number of experiments have been made in the selection of high-yielding varieties. Modern processing equipment has been imported, and the quality of oil produced in the plants having such equipment is reported to be excellent.

Dahomey, French Guinea, Sierra Leone, and the Cameroons are other important producing colonies. In most of the colonies, other crops have offered no great amount of competition. In the Gold Coast, however, the increasing demand for cacao has limited the progress of the oil-palm industry.

Table 26.- *Palm Kernels: Imports by selected countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Europe:								
Germany	295,300	[1] 335,800	-	-	-	-	-	-
Belgium-Luxemburg	5,200	30,300	-	-	-	-	-	21,800
Denmark	9,500	33,000	500	-	-	-	-	-
Estonia	-	[1] 100	-	-	-	-	-	-
France	23,400	[1] 98,200	-	-	-	-	-	-
Italy	1,100	-	-	-	-	-	-	-
Latvia	-	[1] 700	-	-	-	-	-	-
Norway	-	[1] 100	-	-	-	-	-	-
Netherlands	14,500	42,200	-	-	-	-	-	-
Poland-Danzig	-	[1] 19,300	-	-	-	-	-	-
United Kingdom	216,000	176,800	347,082	408,041	464,185	559,073	328,253	552,871
Czechoslovakia	15,100	[1] 23,100	-	-	-	-	-	-
Austria	-	[1] 1,000	-	-	-	-	-	-
Portugal	-	22,500	-	24,000	24,500	23,000	-	-
Yugoslavia	-	[2] 200	-	-	-	-	-	-
Total	566,100	770,600	-	-	-	-	-	-
North America:								
United States[3]	100	20,000	14,600	6,900	1,100	100	29,681	41,472
Grand total	566,200	790,600	-	-	-	-	-	-

[1] Less than a 5-year average.

[2] 1-year average only, 1939.

[3] Imports for consumption beginning 1934.

Compiled from official and trade sources.

Netherlands Indies

Before the war, the oil-palm industry of the Netherlands Indies had a phenomenal expansion. The palm was taken to the Netherlands Indies from Africa as early as 1848, when a number of trees were set out in the Botanical Gardens of Buitenzorg. It was not, however, until 1910 that the present industry had its beginning. During the first 4 years about 6,500 acres were planted. Owing to World War I, further planting was delayed until 1918, when it was resumed on a large scale. Approximately 250,000 acres had been planted by 1940, of which 183,100 were in the bearing stage. Furthermore, additional plantings had been planned. Practically all the acreage planted was on the eastern coast of Sumatra near the Straits of Malacca, but small plantings were made on the east coast of Atjeh.

After considerable experimentation, a suitable high-yielding variety called the Deli was developed. The fruit of this variety has a very large percentage of pulp and a relatively small kernel. Soil and climatic conditions of Sumatra are well-suited to the oil palm, which is planted at elevations varying from 30 to 1,500 feet. Cultural practices are modern and well-developed. Some of the acreage is planted with intercrops during the early years of growth of the palms. As a soil-conservation measure, the use of cover crops is common. The usual number of trees planted per acre ranges from 48 to about 60, depending on whether a square or triangular method of planting is followed. Trees usually come into bearing the fourth year and reach full production about the eighth or tenth year.

In the prewar years virtually all the 60 plantations were owned by Europeans. The plantations were large in size, averaging around 3,000 acres. For the most part, they were highly mechanized.

Production of palm oil in Sumatra in 1940 was estimated at 263,500 short tons, which compares with the prewar 1935-39 average of 218,800 tons a year. The output of palm kernels for 1940 totaled 20,700 tons, compared with the 1935-39 average of 46,100 tons. The reason for the reduction in 1940 was that palm kernels had only a limited market because of the German occupation of European countries. No palm kernels were crushed domestically. Normal production for 1940 would have been more than 60,000 tons.

The 1940 yield of palm oil per acre averaged 2,880 pounds, compared with the annual average, 1935-39, yield of 2,500 pounds. Thus, in Sumatra the average yield was higher than that obtained in neighboring Malaya and about double that of Africa.

Practically none of the palm oil and palm kernels are consumed within the Netherland Indies. The natives use large quantities of coconut oil instead.

Reports state that a considerable portion of the crushing and expressing equipment on the plantations was removed or destroyed during the war. Most of the planted area is believed to have suffered relatively little damage in recent years, although it will be necessary to prune and clean out underbrush before the plantations are brought back to prewar condition.

British Malaya

As in the Netherlands Indies, the commercial oil-palm industry of British Malaya dates from around World War I. The decade of greatest expansion was from 1924 to 1933. During this period, the area planted increased from 5,930 to 61,929 acres.

After 1933, plantings increased more slowly and by 1940 had reached 78,256 acres, of which about 65,600 had reached the bearing stage. Available information indicated that in 1940 more than 30,000 additional acres had been set aside for future plantings.

Oil palms in Malaya are cultivated exclusively as an estate crop. In 1939 there were 48 plantations, of which 9 accounted for 68 percent of the total acreage. Almost 93 percent is concentrated in Johore, Perak, and Selangor.

The latest estimates available are those for 1940, in which year production totaled 64,800 short tons of palm oil and 10,800 tons of palm kernels. The annual palm-oil output during 1935-39 averaged about 43,200 tons The palm-oil prewar yield per acre is believed to have averaged about 2,200 pounds. In the early years of the industry, before high-yielding varieties of palms were developed, the yield per acre of palm oil averaged from 1,600 to 1,700 pounds.

While a break-down is not available, it is known that the bulk of Malayan palm-oil production was unbleached. Only small quantities were bleached for export to India and other Near Eastern markets, as well as for local soap factories. The quality of the oil produced in Malaya was considered uniformly high. Its free fatty-acid content ranged from 3 to slightly more than 5 percent.

Domestic consumption of palm oil was limited, averaging around 1,000 short tons yearly. Some unsuccessful efforts were made to introduce the use of bleached palm for imported peanut oil. None of the palm kernels were crushed or consumed domestically.

There have been indications that about 15,000 tons of palm oil would be available for export in 1946. Apparently, the damage to the industry by the Japanese was not so extensive as previously believed.

BABASSU KERNELS AND OIL

SUMMARY

The 1946 Brazilian babassu production may reach 66,000 short tons of kernels, compared with the 1935-39 average of 46,200 tons and the reported all-time high of 79,500 tons in 1941. (See table 27.)

Table 27.- *Babassu Kernels: Production in Brazil, averages 1925-29 and 1935-39, annual 1940-46*

PERIOD	QUANTITY	PERIOD	QUANTITY
	Short tons		*Short tons*
Average:		Annual, Cont'd.	
1925-29	26,300	1942	62,600
1935-39	46,200	1943[1]	55,300
Annual:		1944[1]	27,600
1940	75,100	1945[1]	55,000
1941	79,500	1946[2]	66,100

[1] Unofficial estimate.

[2] Preliminary estimate.

Compiled from official and trade sources.

OUTLOOK

Babassu-kernel oil has a high lauric-acid content and should find a ready market this year. Because of the demand and of the existing trade agreements between the United States and Brazil, the future market outlook for both the kernels and oil appears bright. The volume of output, however, may not show much increase because of a lack of transportation, inadequate labor supply, and the difficulty in cracking the extremely hard nut.

PRODUCTION

Babassu palms, which grow wild over a widespread area in Brazil, are scientifically classified as ***Orbignya martiana*** or ***Orbignya speciosa***. The oil obtained by crushing the kernels has properties similar to those of coconut oil. It is used in soap, edible compounds, and margarine.

Brazil's production of babassu kernels is again moving upward following a low period in recent years. Owing to a series of problems which began in 1942, the trend of production started downward, reaching a low point of 27,600 tons in 1944. This occurred despite a world shortage of fats and oils, especially of the babassu type.

By an agreement of July 1942 between the United States and Brazil, 75 percent of the latter's babassu-kernel output was to be shipped to the United States. A cooperative program was undertaken by both Governments to improve transportation and other conditions in the two leading producing States, Maranhão and Piauí.

The lack of suitable means to move the nuts from the growing regions has hindered the industry since its beginning, transportation being a general problem in the Brazilian interior. Under the agreement, some progress has been made toward solving this problem, but only a small percentage of the available babassu nuts are now gathered.

Another of the basic problems limiting the expansion of the industry is the difficulty in cracking the hard-shelled babassu nut. The cracking operation is still performed by hand labor. The nut is held on a small axe or stone and then struck with a block of wood. A competent worker's daily output averages about 25 pounds of kernels. This rudimentary type of cracking requires a vast amount of labor to achieve volume production. Most workers, however, do not spend full time in cracking. During the war some of the labor supply moved into the Amazon Basin for better paying jobs in the rubber industry. Estimates indicate that 75,000 people in Maranhão alone are engaged in some aspect of the babassu industry.

Much of the future of babassu oil depends upon the development of equipment which can be used to reduce the excessively high cost of production in terms of man-hour units of labor. A number of cracking machines have been devised, but most of them have been unsuccessful. A plant was established at Kelru, in the State of Maranhão in an attempt to industrialize the babassu-kernel output, but since operations were actually begun in 1945 reports have been rather pessimistic. The idea was to crack the nuts with a minimum of hand labor and to utilize all the byproducts, such as cellulose, starch, charcoal, acids, and oil cake.

The quantity of babassu oil processed in Brazil in 1944 totaled 15,282 tons, compared with 6,960 tons in 1943 and 5,774 tons, the prewar 1935-39 average. The sudden increase in production in 1944 may be attributed not only to a strengthening of domestic demand but to the tendency which then prevailed to ship larger quantities of kernels to South Brazil than the 25 percent called for in the agreement. A noticeable increase in quantities of oil consumed domestically in soap and other products has been apparent since 1944.

No reliable data exist on the total number of babassu palms in Brazil, but estimates vary from 5 to 25 billion trees, which grow over an area of some 33 million acres. The State of Maranhão, which accounts for about 70 percent of the total production, is conservatively estimated to have 2 billion trees. Piauí, Mato Grosso, Goiaz, and Minas Gerais are also known to have vast numbers of palms.

Each bearing tree produces from 2 to 4 bunches of nuts yearly, and a bunch contains from 200 to 400 nuts. At times a mature palm will yield a ton of nuts in the shell, which contain about 275 pounds of kernels. The number of kernels per nut usually averages from 4 to 6 but at times as high as 8.

In the producing region the palm is utilized in many different ways. The leaves are used for roof covering, baskets, mats, hats, and saddlebags. The shelled nuts are burned as fuel, and the oil is used in native lamps and for cooking purposes.

TRADE

In 1867 the first attempt was made to ship unshelled babassu nuts. Upon their arrival at Liverpool no suitable means could be devised to crack them, and the shipment was a total loss. In 1911 the first shipment of kernels was made to Germany. From that year until 1935, practically all exports went to Europe. In the last decade, the United States has been the most important market. Just before the war the first shipments of babassu oil were made, but thus far exports have averaged less than 1,500 short tons annually. (See table 28.)

Export prices of kernels and oil have been controlled by the United States-Brazilian agreement of July 1942. At that time the price of kernels of fair average quality was fixed at $125.50 per metric ton ($113.85 per short ton) in bags, net weight, f.o.b. steamer at São Luiz, and $125.00 per metric ton ($113.40 per short ton), f.o.b. steamer at Parnaîba. The price of oil was fixed at $10.75 per 100 pounds, net weight in drums at São Luiz and Parnaîba, and $9.75 per 100 net pounds in bulk.

Table 28.--*Babassu Kernels and Oil: Exports from Brazil, in terms of kernels, by countries of destination, averages 1926-29 and 1935-39, annual 1940-45*

COUNTRY OF DESTINATION	1926-29[1]	1935-39	1940	1941	1942	1943[2]	1944[2]	1945[2]
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Germany	12,300	100	400	0	0	0	0	0
Denmark	1,900	100	0	0	0	0	0	0
United States	(3)	31,100	45,800	0	23,900	18,100	8,300	[4]33,800
Great Britain	100	(3)	(3)	34,500	0	0	0	0
Holland	4,600	(3)	0	0	0	0	0	0
France	1,200	(3)	0	0	0	0	0	0
Venezuela	0	0	200	6,300	4,200	-	-	-
Colombia	0	0	0	2,500	1,300	-	-	-
Others	1,000	400	0	(3)	4,000	6,500	-	-
Total	21,100	31,700	46,400	43,300	33,400	24,600	8,300	[5]47,000

[1] No country break-down available for 1925.

[2] No official data yet released.

[3] Less than 100 tons.

[4] First 8 months.

[5] Total 1945 indicated by trade sources.

Compiled from official and trade sources.

FLAXSEED AND OIL

SUMMARY

Flaxseed, better known as linseed in many countries, is the source of the world's most important drying oil. World production in 1945 was estimated at 136.2 million bushels, or approximately the same as the 1935-39 average annual output (fig. 7). A record outturn of 180 million bushels was harvested in 1943, primarily as the result of an extensive production program in the United States and Canada. The following year, however, production dropped to a low of 114 million bushels, because of drought in Argentina and the competition of other crops in the United States and Canada.

Normally, more than half the world's flaxseed production enters international trade as seed. Annual exports during the 1930's averaged 75 million bushels, of which approximately 80 percent originated in Argentina. The volume that will enter world trade channels in 1946 is expected to be relatively small. This is attributed to the delay in Argentine exports, that country's plan to export primarily linseed oil, and to the export embargo by the Indian Government. Europe and the United States normally import the bulk of the flaxseed entering foreign trade. This year's import demand from these areas far exceeds the supply available.

OUTLOOK

World demand for linseed oil will undoubtedly encourage larger acreages in the South American countries. Argentina has advanced the price to producers. The Government's buying price for flaxseed is 35 pesos per 100 kilograms ($2.65 per bushel). Linseed oil produced for export is also under Government control; the buying price is 0.99 peso per kilogram (13.3 cents per pound). Export prices have not yet been established for seed or oil. The United States goal called for an increase of 6 percent over the 1945 planted acreage, but the estimate of July 1 showed a decrease of 33 percent, and of 37 percent in the harvested acreage. The United States support price for the 1946 flaxseed crop is $3.60 per bushel for No. 1 grade, Minneapolis basis. The additional 50 cents above the 1945 price was announced after plantings were completed.

Apparently the Canadian Government's increase in the price of flaxseed from the 1946 crop was not sufficient to induce farmers to plant the desired acreage. The goal called for an 18-percent increase, but, according to an official survey of June 30, 1946, acreage in the Prairie Provinces will be 4 percent smaller than that of last year. The new price, $3.25 (Canadian currency) per bushel for No. 1 C W flaxseed, basis lakehead or Vancouver, is an increase of 50 cents per bushel over the earlier price but was not effective until August 1.

Indications are that in future world trade linseed oil will increase in importance and flaxseed will decline. Argentina has established a large crushing industry and no doubt wishes to continue this undertaking. Trade sources reported the 1944 and 1945 linseed-oil output at approximately 500,000 and 330,000 short tons, respectively. India and Canada also have increased their processing facilities in recent years.

TYPES AND USES

There are many differences of opinion as to the origin of the flax plant *(Linum usitatissimum)*; however, the type grown primarily for seed is probably a native of

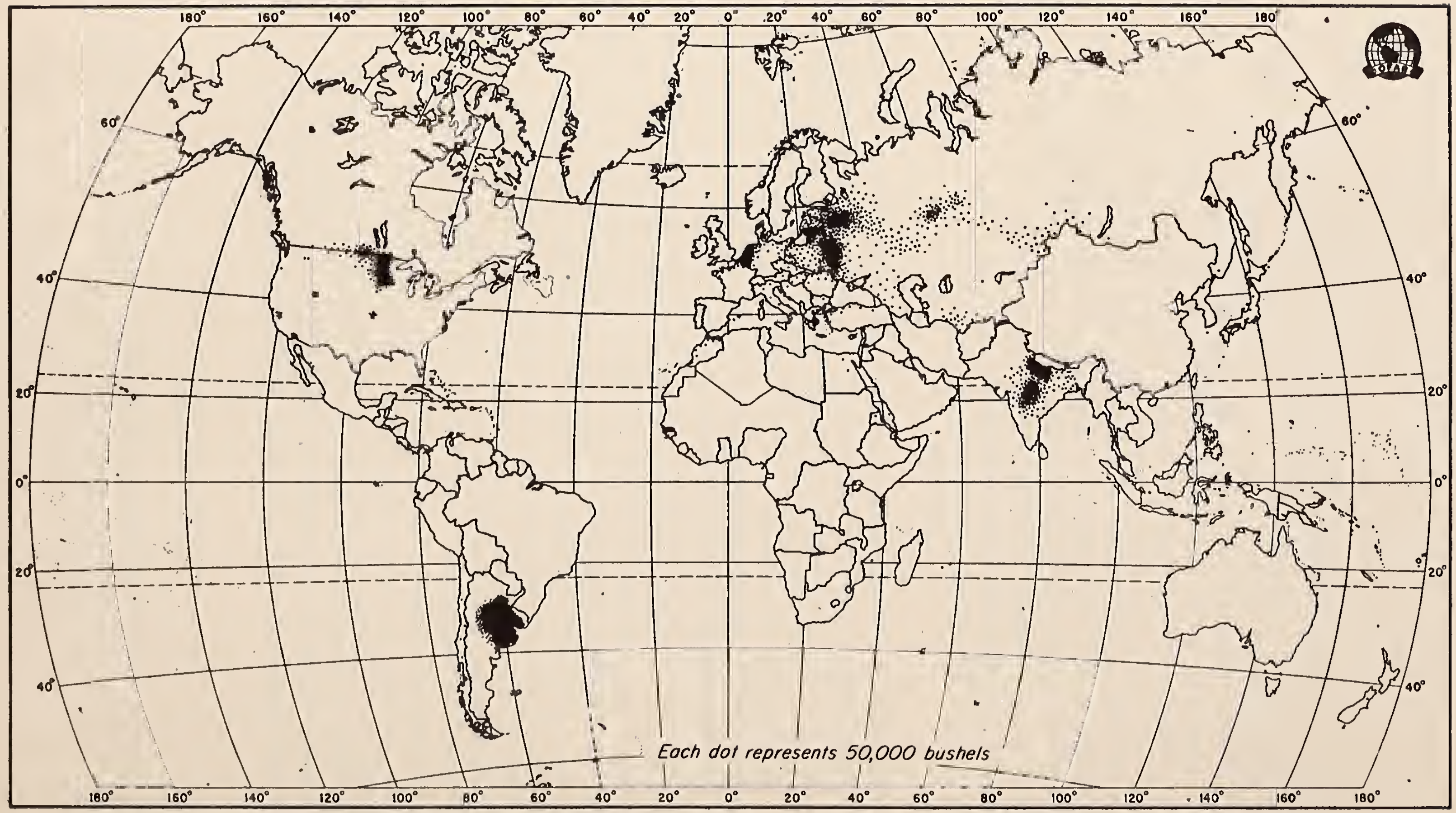


FIGURE 7.-World flaxseed production average 1935-39

central Asia. The oil obtained from the seed, known as linseed oil, is one of the important industrial oils. It is also used for edible purposes in some countries. The oil content of flaxseed varies from 32 to 43 percent, the quantity depending upon the variety and upon seasonal influences; the usual extraction, however, is from 33 to 34 percent. The bulk of the linseed-oil production is used in paint and varnish, although sizable quantities are consumed in the manufacture of linoleum, oilcloth, and printing inks and as a protective coating and as core oil. Small amounts are also used in the production of soap and leather. In Asia, the Soviet Union, and several countries of continental Europe linseed oil is now used for edible purposes. Argentina burned linseed oil and flaxseed for fuel during World War II when imports of fuel oil and coal were shut off.

PRODUCTION BY REGIONS

Flaxseed is grown to some extent on every continent, with normally 80 percent of the world's output cultivated in Argentina, the Soviet Union, India, and the United States. World production has fluctuated widely since the early 1920's, reaching a record of 180 million bushels in 1943, compared with the 1935-39 average of 137 million. During the 1930's, production was at a low level, owing primarily to the decreased demand and partly to the short crops in North America resulting from a number of exceptionally dry years. Argentina has been the largest producer during the past three decades. The Soviet Union was second in production during the 1930's, when the United States fell to fourth place as a result of drought. Expanded production, which began in North America in 1939, continued an upward trend until 1943, when the United States reached a record harvest of 51.9 million bushels and Canada produced 17.9 million, the largest harvest for that country since 1912. India continues to be the largest flaxseed producer and exporter in Asia. (See table 29.)

North America

United States

United States flaxseed production in 1945 was 36.7 million bushels compared with 23.1 million a year earlier and the 1935-39 average of 11.0 million. Although the 1945 outturn exceeded disappearance of normal years, the supply was low in relation to requirements and to the shortage of other oils usually used in the drying industry. Domestic consumption is now at a high level, and imports will be required to maintain industrial activity. This country has expended millions of dollars by way of incentive payments or subsidies to farmers to procure additional supplies of vegetable oils. In the 5 years preceding Pearl Harbor, 1937-41, flaxseed production averaged 19.6 million bushels. Since that time the outturn has increased to an average of 38.7 million.

Normally, the United States is the world's largest consumer of flaxseed and undoubtedly regained that position in 1945. In 1943, Argentine consumption was greater owing to the quantity used as fuel either in the form of seed or linseed oil. Annual consumption of linseed oil in the United States in the late 1930's was about 500 million pounds (27 million bushels in terms of seed). During the next few years there was a rapid increase because of military construction; the peak was reached in 1942, when 832 million pounds (44 million bushels) were consumed.

Table 29.- *Flaxseed: Acreage and production in specified areas, year of harvest, averages 1925-29 and 1935-39, annual 1943-45*[1]

CONTINENT AND COUNTRY	ACREAGE					PRODUCTION				
	AVERAGE		1943	1944	1945[2]	AVERAGE		1943	1944	1945[2]
	1925-29	1935-39				1925-29	1935-39			
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
North America:										
United States	2,836	1,451	5,847	2,750	3,914	20,216	10,991	51,946	23,135	36,688
Canada	569	307	2,948	1,323	1,059	4,558	1,508	17,911	9,668	7,593
Mexico	7	16	105	(125)	(140)	47	111	1,145	(984)	(1,181)
Estimated total[3]	3,500	1,800	9,000	4,300	5,200	25,000	12,700	71,100	34,300	45,600
Europe:										
Poland[4]	276	[5] 340	-	-	-	2,603	[5] 2,817	[6] 2,157	-	-
Lithuania[4]	211	205	-	-	-	1,456	1,358	-	-	-
Latvia[4]	163	164	-	-	-	808	801	-	-	-
Rumania[4]	52	54	-	-	-	267	339	-	-	-
Estonia[4]	89	66	62	-	-	396	366	-	-	-
France[4]	76	92	121	104	94	693	464	607	-	-
Belgium[4]	59	75	31	26	60	512	664	282	179	546
Hungary	7	19	-	-	7	54	283	-	-	51
Yugoslavia[4]	30	33	-	-	-	38	52	-	-	-
Czechoslovakia[4]	53	[5] 40	-	-	-	342	[5] 289	-	-	-
Germany[4]	49	[5] 105	-	-	-	-	[5] 1,123	-	-	-
Netherlands[4]	37	42	37	29	23	443	546	403	(300)	(230)
Italy	44	16	[4] 70	[4] 54	-	338	202	391	320	-
Austria	10	[5] 5	-	-	-	49	[5] 29	-	--	-
Bulgaria[4]	1	8	[7] 28	[7] 29	-	10	52	[7] 265	[7] 160	-
Estimated total[3]	1,220	1,300	1,200	1,200	950	8,025	9,400	10,500	10,300	7,500
Soviet Union[4]	4,207	[5] 5,805	-	-	-	22,475	[5] 29,526	-	-	-
Asia:										
India[8] [9]	3,412	3,885	3,406	3,533	3,461	16,976	18,096	16,400	15,240	15,640
Turkey[4]	[5] 12	48	-	-	-	[5] 215	349	637	(660)	177
Japan[4]	31	[5] 45	-	-	-	166	211	288	-	-
Cyprus[4]	2	2	-	-	-	17	31	20	12	-
Estimated total excluding China[3]	3,500	4,000	3,500	3,600	3,550	20,900	20,400	18,900	17,600	17,500
Africa:										
Morocco	48	51	126	59	101	446	362	984	303	172
Tunisia	6	1	-	-	-	40	4	-	-	-
Eritrea	[10] 3	[5] 4	-	-	-	[5] 68	[5] 29	-	-	-
Egypt[4]	3	7	31	30	7	32	87	311	322	77
Estimated total[3]	65	65	165	95	120	600	490	1,340	670	310
South America:										
Argentina	6,376	6,077	4,986	3,098	3,419	73,390	59,571	61,926	30,967	39,486
Uruguay	204	407	255	403	457	2,240	3,894	2,854	4,055	4,685
Chile[4]	[5] 1	[5] 5	13	15	12	[5] 18	[5] 37	139	137	151
Estimated total[3]	6,600	6,500	5,300	4,000	4,000	76,000	64,200	66,000	36,000	45,000
Oceania:										
New Zealand	6	1	1	-	-	84	17	-	-	-
Estimated total[3]	8	3	66	66	66	100	24	250	250	250
Estimated world total excluding China	19,100	19,500	24,000	18,300	19,000	153,100	136,800	180,100	114,200	136,200

[1] Harvests of the Northern Hemisphere countries are combined with those of the Southern Hemisphere which immediately follow; thus, the crop harvested in the Northern Hemisphere countries in 1944 is combined with the Southern Hemisphere harvest which began late in 1944 and ended early in 1945.

[2] Preliminary.

[3] Includes estimates for the countries above for which data are not available and for minor producing countries.

[4] Acreage includes area for fiber.

[5] Average of less than 5 years.

[6] Unofficial estimate.

[7] Including southern Dobruja.

[8] Sown area.

[9] Officially reported figures plus Indian official estimates for unreported tracts except in 1943-45, when no estimates for unreported tracts were available.

[10] 1927 only.

Compiled from official sources and publications of the International Institute of Agriculture and includes estimates of the Office of Foreign Agricultural Relations (shown in parentheses) based on foreign-service reports and other information.

Canada

Canada's 1945 flaxseed crop of 7.6 million bushels was 21 percent below that of the previous year and the smallest since 1941. With a carry-over of 2.9 million bushels on August 1, total supplies amounted to 10.5 million bushels, compared with 13.3 million in 1944-45. Exports have declined drastically during the current season. August-December shipments were less than 400,000 bushels, 65 percent smaller than in the corresponding period a year earlier. Total exports of flaxseed during 1945-46 (August-July) probably dropped below a million bushels; however, linseed-oil shipments were undoubtedly larger. The country's crushing industry was greatly expanded during the war, and annual capacity is now estimated at 8 million bushels.

Flaxseed is grown principally in the Provinces of Saskatchewan, Manitoba, and Alberta, where wheat, the chief competing crop, is produced on a much larger scale. A maximum in total flaxseed production was reached just prior to World War I, when the Western Provinces were being opened up and flaxseed proved to be an excellent crop for new land.

Mexico

Mexico's 1945 flaxseed output of 1.2 million bushels compared favorably with other recent harvests of that country. This crop was of minor importance until 1941, when production began to increase. In 1942, the outturn exceeded 1 million bushels, compared with only 123,000 in 1940.

Mexico's flaxseed exports, previously insignificant, totaled 12,000 bushels in 1941. The largest shipments recorded occurred during 1943, when 487,000 bushels moved into foreign trade. Exports during the current season may be larger than the 93,000 bushels shipped in 1945 if copra becomes available to Mexico.

Europe

Meager information available indicates that European flaxseed production for 1945 was the smallest in a decade. Numerous factors reduced the output. The weather was unfavorable, seed for planting and fertilizer were in short supply throughout the continent, and there were local shortages of draft animals and farm machinery.

Soviet Union

Most of the flax in the Soviet Union is grown for fiber, but some is also grown for seed. In 1938, 4,650,000 acres of flax fiber and 870,000 acres of flaxseed were sown. Since the major producing areas were in the section of the country invaded by the Germans, production has been greatly reduced in recent years.

Asia

India's 1945 flaxseed production of 15.6 million bushels was larger than that of the previous year but 14 percent less than the prewar (1935-39) average. Prior to the outbreak of war in Europe, flaxseed was produced chiefly for export, with the bulk of the shipments going to other British Empire countries and continental Europe. Turkey's 1945 outturn is the smallest in a decade but equals the 1930-34 average. Japan's 1945 harvest was also below average because of the war.

Africa

Although Morocco harvested slightly more than 100,000 acres of flaxseed in 1945, production amounted to only 172,000 bushels. The yield per acre was reduced by the severe drought that prevailed during the growing season.

Egypt's flaxseed harvest of 77,000 bushels was much smaller than that of the previous year but compared favorably with the immediate prewar years and was more than double the 1925-34 average. During the war there was a notable expansion in this crop, which reached the peak in 1942 of 543,000 bushels. In the 2 years following there was a decrease of more than 40 percent, and a sharp decline occurred in 1945 because of the Government's increase in the price of wheat without a comparable one for flaxseed.

South America

Argentina

Argentina's 1945 flaxseed production was officially estimated at 39.5 million bushels, a crop much below average for that country. Despite the reduction indicated, stocks of flaxseed on April 1, 1946, must have been large because practically no flaxseed from this crop has been exported, and the practice of burning linseed oil for fuel was discontinued in 1945.

Argentina, the world's largest flaxseed producer, usually accounts for nearly half the world total; its flaxseed output ranks fourth among the crops of the country. In some sections of the Provinces of Entre Rios, Santa Fé, and Buenos Aires flaxseed is first in importance and occupies approximately 75 percent of the total area under cultivation. Flaxseed culture was introduced into northern Buenos Aires during the second half of the last century and spread rapidly to southern Santa Fé, southern Entre Rios, and southeastern Córdoba; then it moved into northeastern La Pampa and to southern Buenos Aires. While expansion appeared to have reached the maximum in the second decade of this century, acreage has since more than doubled; the location of producing areas, however, has remained about the same.

Argentina's flaxseed harvests in more recent years have been greatly reduced, principally because of smaller acreages and unfavorable weather. The 1944 crop was less than half the size of the 1930-34 outturn, and the harvested acreage was correspondingly small.

While Argentina is the outstanding producer of flaxseed, domestic consumption was comparatively small until 1942. During the 15 years 1925-39, flaxseed crushings averaged 0.6 million bushels; after that period they increased steadily until 1944, when more than 50 million bushels were processed. Although linseed-oil production has been greater in recent years, domestic consumption did not increase materially until 1943, when the oil became a substitute fuel. In the same year flaxseed was also burned as fuel. Total consumption in 1943, in terms of flaxseed, is estimated at 48 million bushels and may have been larger during the following year. Imports of fuel oil in 1945 replaced, to some extent, the use of linseed oil for fuel.

Argentine flaxseed exports declined drastically after the loss of European markets in 1939 and to a greater extent after the United States entered the war in 1941. Linseed-oil shipments, however, increased from 360 short tons during 1935-39 to 42,252 in 1945 (38,000 to 4,438,000 bushels in terms of flaxseed). Linseed-oil exports may continue upward as a result of expanded crushing facilities.

Uruguay

Uruguay's 1945 flaxseed production of 4.7 million bushels, from 457,000 acres, was the largest since 1939 and 16 percent more than the revised estimate for the previous year. Despite the fact that locusts invaded the area planted to this crop and caused some damage, the yield per acre was much above average. This country reported an exportable surplus of 2.8 million bushels of seed from the 1944 crop and possibly had a larger quantity from the 1945 outturn. The surplus from both crops is available to the United States, according to an agreement between the two Governments. Purchases are being made by the Commodity Credit Corporation, and flaxseed is being distributed in accordance with recommendations of the Combined Food Board. The price is $2.275 per bushel, f.o.b. Montevideo. An allowance of 10 cents per bushel has been authorized on an unspecified quantity of the old seed to compensate in part for accrued carrying charges.

Chile

Chilean flaxseed production, amounting to 151,000 bushels in 1945, was 10 percent larger than in the previous year and four times the 1935-39 average. The increase in recent years is attributed to Chile's efforts to become self-sufficient in vegetable oils. While total area figures include acreage for fiber, the Provinces of Atacama, Coquimbo, Aconcagua, Santiago, Curico, and Cautín produce flax exclusively

Table 30.- *Flaxseed: Exports from specified countries, averages 1925-29 and 1935-39, annual 1940-45*[1]

CONTINENT AND COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
North America:								
United States[2] . . .	-	-	-	44	2	6	16	11
Canada	2,828	49	65	978	3,379	8,357	6,453	1,182
Mexico	-	[3] 2	2	12	12	487	447	93
Europe:								
Belgium	301	182	-	-	-	-	-	-
Latvia	644	[3] 115	-	-	-	-	-	-
Lithuania	811	977	-	-	-	-	-	-
Netherlands	208	206	-	-	-	-	-	-
Soviet Union	778	0	-	-	-	-	-	-
Asia:								
India	9,442	9,704	8,324	8,995	8,971	1,837	2,680	6,690
China	117	664	36	-	-	-	-	-
Africa:								
Morocco	363	[3] 343	476	[4] 33	523	-	-	-
South America:								
Argentina	63,699	59,177	29,612	26,168	12,405	25,451	10,834	5,300
Uruguay	2,084	3,179	3,991	3,095	1,385	1,481	1,272	[4] 1,152
Others	767	119	175	179	264	172	-	-
Total	82,042	74,717	-	-	-	-	-	-

[1] 1940-45 subject to revision.

[2] Not separately classified until July 1941.

[3] Average of less than 5 years.

[4] Incomplete.

Compiled from official sources.

for seed. In some of these Provinces the acreage has trebled since 1939, and the yield per acre is unusually high. Despite the increased flaxseed production, Chile is still an importer of both seed and oil. Argentina has been the chief source of supply.

Oceania

The small supplies produced in Oceania are retained for domestic consumption. Australia increased flaxseed production during the war in order partially to meet its linseed-oil requirements. Formerly most of the linseed oil imported came from the United Kingdom.

TRADE

Argentina and Uruguay supplied about 82 percent of world flaxseed exports during 1925-39. (See table 30.) Since 1939, exports from these two countries have declined

Table 31.- *Flaxseed: Imports into specified countries, averages 1925-29 and 1935-39, annual 1940-45*[1]

CONTINENT AND COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
North America:								
United States . . .	20,540	18,470	11,825	21,122	13,729	10,624	10,739	3,796
Canada	568	993	874	176	(2)	1	(2)	1
Europe:								
Belgium	4,052	4,171	–	–	–	–	–	–
Czechoslovakia . .	885	[3] [4] 945	–	–	–	–	–	–
Denmark	696	883	478	(2)	(2)	1	6	–
Finland	222	255	25	65	10	23	–	–
France	7,368	[3] 9,971	3,302	1,327	830	–	–	–
Germany	13,602	[3] [4] 7,890	273	251	723	686	–	–
Greece	118	162	80	–	–	–	–	–
Hungary	92	40	–	–	–	–	–	–
Italy	2,380	2,568	1,378	157	79	[5] 157	–	–
Netherlands	13,639	13,082	[5] 1,892	–	–	–	–	–
Norway	602	900	916	498	(2)	–	–	–
Portugal	–	[3] 186	712	212	184	279	162	[5] 170
Spain	663	[3] 587	140	237	169	457	331	–
Sweden	1,447	1,817	709	315	630	827	1,037	[5] 258
United Kingdom . .	13,439	11,366	14,052	9,284	10,586	20,280	10,565	5,692
Asia:								
India	763	496	–	–	–	–	–	–
Japan	464	418	734	1,202	344	223	9	–
South America:								
Brazil	–	583	255	616	236	98	216	[5] 3
Oceania:								
Australia	957	1,339	–	–	–	–	–	2
Other countries . .	1,310	415	2	76	–	–	–	–
Total	83,837	77,537	–	–	–	–	–	–

[1] 1940-45 subject to revision.

[2] Less than 500 bushels.

[3] Average of less than 5 years.

[4] Beginning April 1938, trade between Germany and Austria no longer reported as foreign trade in the German statistics. The same applies to trade between Germany and Sudetenland for the period October-December 1938.

[5] Incomplete.

Compiled from official sources.

Table 32.- *Linseed Oil: Exports from specified countries, averages 1925-29 and 1935-39, annual 1940-45*[1]

CONTINENT AND COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
North America:								
United States	1,176	640	2,385	3,605	28,877	112,233	156,622	15,938
Canada	24	62	562	1,064	318	3,819	13,132	9,652
Europe:								
Austria	230	[2] [3] 46	-	-	-	-	-	-
Belgium	11,752	5,957	-	-	-	-	-	-
Czechoslovakia . . .	128	[2] [3] 410	-	-	-	-	-	-
Denmark	210	21	3	6	-	-	-	-
France	2,189	[2] 10,748	749	711	5,150	-	-	-
Germany	4,172	[2] [3] 28	44	146	94	72	-	-
Italy	202	207	195	46	14	[4] 7	-	-
Netherlands	79,068	86,046	-	-	-	-	-	-
Sweden	634	18	-	-	-	-	-	-
United Kingdom . . .	[2] 24,700	13,278	8,831	3,916	991	235	450	558
Others	130	531	188	89	80	65	41	-
Asia:								
India[4] [5]	364	1,165	7,715	13,629	6,285	2,811	3,486	[4] 2,651
British Malaya . . .	63	58	-	-	-	-	-	-
Japan	222	770	735	538	42	33	0	0
Others	44	[2] 86	54	-	-	-	-	-
Africa (total)	37	[2] 16	27	(6)	711	-	-	-
South America:								
Argentina	132	360	6,376	10,709	36,952	38,824	27,818	[4] 42,252
Uruguay	[2] 12	[2] 110	1,746	1,292	874	986	3,746	[4] 2,184
Others	-	163	222	2	4	2	4	1
Oceania (total)	14	165	792	1,162	-	-	-	-
Total	125,503	120,885	-	-	-	-	-	-

[1] 1940-45 subject to revision.

[2] Average of less than 5 years.

[3] Beginning April 1938, trade between Germany and Austria no longer reported as foreign trade in German statistics. The same applies to trade between Germany and Sudetenland for the period October-December 1938.

[4] Incomplete.

[5] Foreign trade of Burma, beginning April 1937, no longer included with India.

[6] Not available.

Compiled from official sources.

drastically owing primarily to the loss of European markets and partly to the shortage of ocean transportation and submarine hazards. India was second in importance, contributing approximately 12 percent. Although the Soviet Union ranked second among flaxseed-producing countries, its output did not enter into world trade. Argentina was the principal source of flaxseed imported by the United States until 1943. Since that year Canada has been an important supplier.

The United States has usually been the largest importer of flaxseed, followed closely by the Netherlands, the United Kingdom, and Germany. (See table 31.) During the depression years (1930-34), imports into the Netherlands and Germany exceeded those into the United States. The drive for self-sufficiency in raw materials in Germany after 1934 resulted in a drop in imports into that country. Imports into the United Kingdom and the Netherlands were well-maintained until the outbreak of war in 1939. Other countries importing substantial quantities of flaxseed prior to that time were France, Belgium, Italy, Czechoslovakia, and Australia.

World trade in linseed oil in prewar years was rather extensive, especially in Europe, where the oil was derived from imported seed, crushed primarily to obtain cake and meal. The Netherlands led with approximately 70 percent of the world total exports. In fact, the bulk of trade in this product was between the countries of Europe. The United Kingdom ranked first in imports, followed closely by Germany. Switzerland and Austria became significant importers in the immediate prewar years. Linseed-oil imports into other countries of the world were fairly well distributed. (See tables 32 and 33.)

Table 33.- *Linseed Oil: Imports into specified countries, averages 1925-29 and 1935-39, annual 1940-45*[1]

CONTINENT AND COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
North America:								
United States . . .	3,973	356	6	45,166	13,921	33,316	33,270	39,522
Canada	410	1,102	102	66	64	72	66	88
Cuba	-	1,338	960	1,898	1,590	1,285	1,180	1,654
Others	456	[2] 1,672	324	618	188	198	66	88
Europe:								
Austria	4,498	[3] [4] 5,407	-	-	-	-	-	-
Belgium	1,152	1,748	-	-	-	-	-	-
Bulgaria	742	539	-	-	-	-	-	-
Finland	2,690	4,051	849	1,483	-	-	-	-
France	4,069	[2] 431	82	20	4	-	-	-
Germany	21,606	[2] [3] 22,511	19,485	15,960	7,308	[4] 5,895	-	-
Italy	1,787	1,240	246	38	1	3	-	-
Norway	1,657	808	39	1	2	-	-	-
Portugal	875	878	146	155	34	8	415	-
Switzerland	6,643	6,323	4,240	279	178	849	1,424	-
United Kingdom . .	23,773	30,866	6	-	34	0	4,524	8,915
Others	6,662	2,616	73	-	-	-	-	-
Asia:								
India[5]	1,046	540	505	7	75	11	(6)	(6)
British Malaya . .	775	808	-	-	-	-	-	-
China	621	514	796	-	-	-	-	-
Netherlands Indies	2,580	2,260	[7] 2,028	-	-	-	-	-
Philippine Islands	605	1,030	838	-	-	-	-	-
Others	262	[2] 287	-	-	-	17	17	24
Africa:								
Algeria	931	1,424	-	-	-	-	-	-
Egypt	2,468	507	87	172	47	1	-	-
Union South Africa	2,385	4,128	3,542	4,399	-	-	-	-
Others	696	2,320	148	44	-	-	116	-
South America:								
Brazil	4,779	163	109	-	-	70	44	[4] 134
Chile	1,356	591	512	291	138	110	41	[4] 42
Colombia	529	560	441	884	528	-	-	-
Others	1,320	1,042	1,083	1,208	766	498	69	113
Oceania:								
Australia	2,484	926	332	80	-	-	-	-
New Zealand	1,894	3,296	3,608	2,989	2,900	1,090	[4] 2,422	[4] 1,235
Total	105,724	102,282	-	-	-	-	-	-

[1] 1940-45 subject to revision.

[2] Average of less than 5 years.

[3] Beginning April 1938, trade between Germany and Austria no longer reported as foreign trade in the German statistics. The same applies to trade between Germany and Sudetenland for the period October-December 1938.

[4] Incomplete.

[5] Foreign trade of Burma, beginning April 1937 no longer included with India.

[6] Less than 0.5 ton.

[7] Java and Madura.

Compiled from official sources.

CASTOR-BEANS AND OIL

SUMMARY

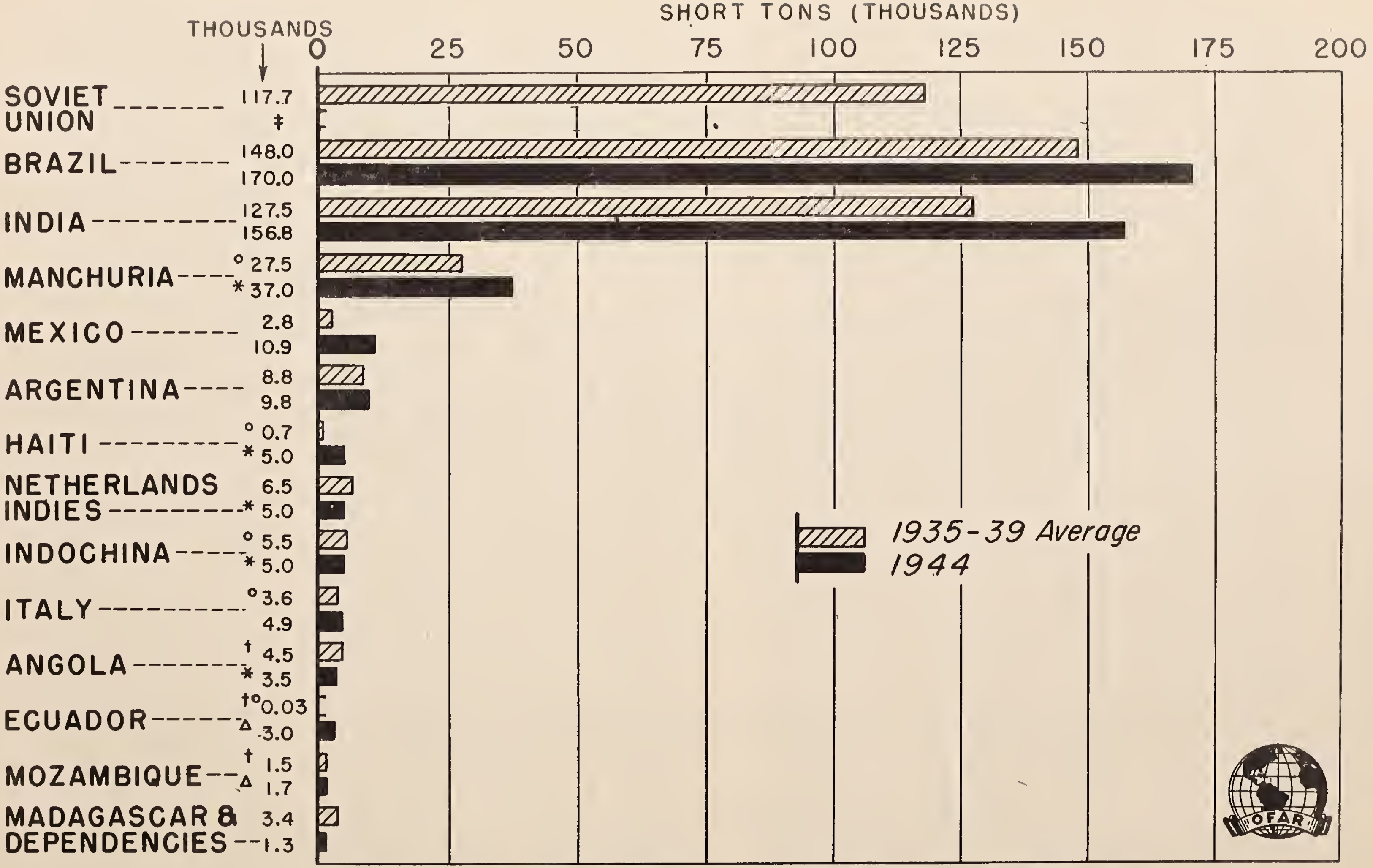
Castor seed or castor-beans, as they are popularly known in the United States, are found in most tropical and subtropical regions, where they grow both wild and in the cultivated state. World production in 1945 was estimated at 480,000 short tons, compared with 470,000 tons in 1944. Production and exports of castor-beans are of importance in only two countries, Brazil and India. (See fig. 8.) During the years 1925-45, the positions of the two countries have been entirely reversed. In 1925, the Indian crop totaled 139,000 short tons, and exports amounted to 125,000 tons. Brazilian production for that year was not officially reported, but an unofficial estimate placed the outturn at approximately 20,000 tons, and exports were at a correspondingly low level. In 1945, India produced 147,000 tons but exported a relatively small quantity. The Brazilian crop, on the other hand, exceeded 180,000 tons, and shipments amounted to 166,000 tons. Other countries producing castor-beans are the Soviet Union, Manchuria, Netherlands Indies, Madagascar, Angola, Argentina, Mexico, and, in recent years, several other Latin American countries. Although data relating to the castor-bean crop in the Soviet Union are incomplete, indications point to a considerable increase in acreage during the 1930's. The United Kingdom does not grow castor-beans, and production in continental Europe is very small. In the United States they have been grown at intervals only for seed and experimental purposes. There has been a material expansion in castor-bean acreage in Japanese-occupied countries of the Orient and in southern and western China.

OUTLOOK

When practically every country in the world was engaged in war or war industry, the consumption of castor oil increased in unprecedented proportions. Total consumption in the United States rose from 45,000 tons in 1940 to over 100,000 in 1944. The demand for castor oil continues, and the expectation is that it will remain at a high level as long as there is a shortage of industrial oils, particularly drying oils. When competing products become more plentiful, the price may be a deciding factor. Dehydrated castor oil compares favorably with tung oil and surpasses linseed oil in fast-drying qualities.

The outlook for the castor-bean and castor-oil industry in Brazil over a period of years is bright if export demand can be stabilized at reasonable prices. The exportable surplus of castor-beans is expected to exceed 165,000 tons in 1946, and a surplus of 5,000 to 10,000 tons of oil is also anticipated. Present prices are encouraging producers and dealers to collect and move all available quantities to market. The internal transportation problem continues to be serious, especially in Baîa and Cearâ.

Experimental work being carried on by the Brazilian Ministry of Agriculture in testing and improving varieties should advance the country's position in the production and marketing of castor-beans. The Agricultural Experiment Institute is currently working with 68 varieties of castor-beans, 16 of which are dwarf varieties. Preliminary tests indicate that the dwarf have a great advantage over the usual tall varieties. About two and a half times as many plants can be grown in the same space, seed pods are more compact, the plants are more resistant to wind, and the length of time required for maturing is shorter. Seed with an oil content as high as 57 percent have been produced at the experiment station.



* ESTIMATED. † EXPORT FIGURES. ° LESS THAN FIVE-YEAR AVERAGE. ‡ NO DATA

Δ AVERAGE ANNUAL PRODUCTION.

FIGURE 8.-Production of castor-beans in specified countries, average 1935-39, and 1944.

Although India's 1946 castor-bean outturn (harvested January-February) is much smaller than the record crops of the 2 previous seasons, the supply should be ample to meet local requirements and afford some for shipment abroad. Exports were at a low level during 1941-44; and, despite last year's increased shipments, stocks of castor-beans and oil are probably above average.

TYPE AND USES

The castor plant, *Ricinus communis*, probably a native of India or Africa, is extremely variable in size and color of stems and leaves, as well as in size and color markings of its beans. Formerly the bean was the only product of the plant that was

Table 34.- *Castor-Beans: Production in specified areas, averages 1925-29 and 1935-39, annual 1940-45*

CONTINENT AND COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945[1]
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
North America and Central America:								
Mexico	[2] 10	2,770	3,789	5,604	8,384	12,244	10,882	9,920
Haiti	[2,3] 110	[3] 700	1,212	1,764	[2] 884	[2] 3,650	-	-
Estimated total[4]	150	4,080	7,610	9,850	12,660	19,150	15,890	14,420
Europe:								
Italy	-	[3] 3,586	[2] 11	-	-	-	4,879	2,895
Rumania	-	638	-	-	-	-	-	-
Estimated total[4]	10	6,690	3,030	3,510	4,010	5,110	11,630	5,120
Soviet Union	29,762	117,746	[5] 175,078	-	-	-	-	-
Asia:								
China[2]	9,941	180	1	[6] 342	-	-	-	-
India	145,152	127,456	108,640	117,600	102,144	164,640	156,800	146,720
Indochina	[2,7] 334	[3] 5,512	-	-	-	-	-	-
Iran[2].	514	181	2,240	2,819	-	-	-	-
Manchuria	(8)	[3] 27,534	22,046	28,813	37,478	-	-	-
Netherlands Indies[9]	[3] 4,288	6,510	4,936	-	-	-	-	-
Estimated total[4]	162,890	169,910	145,560	161,880	154,830	214,840	207,000	196,720
Africa:								
French West . . .	-	[3] 1,304	-	-	-	-	-	-
Madagascar and Dependencies . .	[2] 1,592	3,439	1,323	2,315	154	1,102	1,323	8,818
Angola	-	[2] 4,526	[2] 4,134	3,196	-	-	-	-
Mozambique	[2] 480	[2] 1,460	[2] 887	[2] 972	[2] 614	[10] 1,654	[10] 1,654	-
French Morocco . .	[2,3] 94	[3] 236	-	-	-	-	-	-
Estimated total[4]	3,630	12,850	9,630	9,280	6,500	8,360	8,580	16,020
South America:								
Argentina	6,834	8,801	7,502	8,374	6,504	5,402	9,832	-
Brazil	[10] 19,080	148,014	163,296	190,710	142,545	155,824	170,018	181,880
Colombia	-	[5] 784	1,084	1,074	[10] 1,323	[10] 1,323	-	-
Ecuador.	-	[2,3] 29	[5] 55	882	1,654	[5] 2,204	[10] 3,032	3,000
Estimated total[4]	25,920	160,910	173,440	202,910	154,030	166,760	186,490	197,270
Estimated world total	222,362	472,186	514,348	462,430	352,030	434,220	469,590	479,550

[1] Preliminary. [2] Export figures. [3] Average of less than 5 years. [4] Includes estimates for countries listed for which data are not available and for minor producing countries. [5] Unofficial estimate. [6] January-August only. [7] 1929 only. [8] Included with China. [9] Calculated from exports of beans and oil in terms of beans. [10] Average annual production.

Compiled from official and trade sources.

utilized commercially. In recent years, however, the leaves and stalks have come into prominence for use in the manufacture of insecticides. Castor-beans are utilized for oil, cake, and meal. The oil content of the beans, varying from 35 to 55 percent, usually averages about 45 percent. This oilseed is identified by many different names, perhaps the greatest variety occurring in the Latin American trade statistics, where it is listed as: Ricino, tartago, higuereta, higuera infernal, cherva, higuerilla, palmachristi, carrapato, and mamona.

Castor oil has numerous uses, and it supplied a vital need in the manufacture of many articles necessary to our military forces during World War II. It has also become important in the coating of food containers. The better known uses, however, are in the manufacture of paint, varnish, linoleum, oilcloth, printing inks, lubricants, artificial leather, and soap; in the dyeing and cloth-printing industry; and as a plasticizer.

PRODUCTION

World production of castor-beans, amounting to 480,000 tons, in 1945 was the largest since the record crop of 514,000 tons in 1940. A noticeable decline in production occurred during the early 1940's in Europe, Africa, and in the Soviet Union. A true picture of the development of castor-beans is difficult to present. Some countries publish area only, others just production, and in many instances exports alone are the guide to output. The lack of uniformity is probably due to the fact that in many tropical countries the plant is a perennial. (See table 34.)

Brazil's 1945 castor-bean crop, totaling 182,000 tons, was second only to the record harvest of 191,000 tons in 1941. Brazil's progress in castor-bean production is evidenced by the fact that the output was not recorded in official statistics until 1934, when 84,000 tons were reported, representing about 25 percent of the total world

Table 35.- *Castor-Beans: Exports from specified countries, averages 1925-29, 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
India	128,648	40,325	100,406	12,475	38,222	20,665	5,577	34,810
Brazil	17,186	120,082	129,514	244,504	128,053	171,612	160,360	165,838
China	9,941	180	-	[1] 342	-	-	-	-
Manchuria	(2)	22,324	-	-	-	-	-	-
Netherlands Indies .	[3] 4,146	6,500	4,936	-	-	-	-	-
Angola	-	4,614	4,133	70	-	-	-	-
Madagascar	1,592	2,506	3,728	1,078	54	1,192	1,287	[1] 788
Argentina	[3] 652	2,012	52	286	0	0	0	0
French West Africa .	-	1,194	[4] 974	[4] 1,303	-	-	-	-
Iran	514	181	2,240	2,819	-	-	-	-
Mozambique	480	1,460	887	972	614	-	1,914	-
Haiti[5]	[3] 110	81	623	1,182	884	3,650	-	-
Ecuador	-	[3] 29	26	372	1,062	644	1,407	796
Others	[3] 169	[3] 1,894	801	647	10	22	49	[1] 119
Total	163,438	203,382	-	-	-	-	-	-

[1] Incomplete.

[2] Included with China.

[3] Average of less than 5 years.

[4] Exports from Dahomey only.

[5] October-September year; data are placed in calendar year in which most of the season occurs; i.e., 1939-40 data are placed in the calendar year 1940.

Compiled from official sources.

Table 36.- *Castor-Beans: Imports into specified countries, averages 1925-29 and 1935-39, annual 1940-45*[1]

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
United States	64,694	66,462	118,894	197,225	132,806	158,202	166,863	152,190
United Kingdom . . .	36,740	34,679	65,518	7,206	32,070	58,066	20,928	23,490
France	26,096	21,465	9,816	1,906	129	-	-	-
Belgium-Luxemburg . .	18,565	9,938	-	-	-	-	-	-
Germany	-	[2] 16,160	-	-	-	-	-	-
Italy	12,777	16,030	25,216	3,983	165	[3] 92	-	-
Japan	10,946	30,809	28,884	33,400	3,306	5,160	5,354	-
Spain	2,398	-	1,288	1,902	1,628	2,506	1,875	-
Others	-	[2] 4,473	347	1,224	1,362	1,244	2,042	[3] 498
Total	172,216	200,016	-	-	-	-	-	-

[1] 1940-45 subject to revision.

[2] Average of less than 5 years.

[3] Incomplete.

Compiled from official sources.

production; by 1940 Brazil's share was 32 percent. Since 1934, production has increased annually, with the exception of one or two years when inadequate transportation prevented collection of the wild crop. The country is well-adapted to the cultivation of the castor plant. The State of Baía was the largest producer until 1943, when São Paulo took the lead. The expansion in acreage late in 1942 (for harvest early in 1943) was the result of an agreement between the Brazilian and the United States Governments whereby the United States guaranteed Brazil a favorable market for castor-beans and provided for the purchase of a minimum of 200,000 tons of beans, or the equivalent in oil, during the 12 months ending June 30, 1943. With United States requirements less urgent by that date, the agreement was not renewed, and as a result production in São Paulo has fluctuated with changing prices.

Brazilian castor-bean exports did not take the lead in world trade until 1936, when they reached 102,000 tons, accounting for 57 percent of the total, and supplied 89 percent of the United States requirements. Other important markets were Belgium, France, and the United Kingdom. From 1937 to 1941, inclusive, Japan, Germany, Netherlands, and Italy bought significant quantities of Brazilian castor-beans.

Exports of Brazilian castor oil are small in proportion to those of beans. Prior to 1939 shipments had not exceeded 400 tons. In that year, they amounted to 583 and reached 14,000 by 1943; then they dropped to 9,000 tons in 1944. Total exports of beans and oil in terms of beans accounted for approximately 83 percent of the estimated production during 1936-43.

Of the producing countries, other than Brazil, in the Western Hemisphere, Mexico holds first place. That country made elaborate plans to meet the world demand for castor-beans in 1942; and, while production increased, exports were negligible. Ecuador and Haiti have increased their output and in turn have contributed their share to international trade.

India was the only castor-bean-producing country of any significance until the middle 1930's. Although complete production data are not available prior to 1925, exports were rather large. In 1890, shipments of castor-beans amounted to 46,000 tons and of castor oil, 14,000. Bean exports increased, reaching the peak of 133,000 tons in 1913. After that year, they were smaller, but India continued to be the largest contributor until 1936, when Brazil took first place. Since that time India's exports have declined; however, that country continues to be the chief source of supply for the United Kingdom and retained other European markets until 1940.

Table 37.- *Castor Oil: Exports from specified countries, averages 1925-29 and 1935-39, annual 1940-45*[1]

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
North America:								
United States . . .	[2] 344	352	645	648	650	414	1,361	660
Others	–	4	8	10	14	28	2	0
Europe:								
Belgium-Luxemburg .	6,640	4,022	–	–	–	–	–	–
France	3,964	1,384	562	143	68	–	–	–
Germany	78	78	3	53	113	65	–	–
Italy	202	236	50	213	1	–	–	–
Netherlands	28	186	[3] 4	–	–	–	–	–
United Kingdom . .	7,543	6,144	783	246	6	19	9	182
Others	[2] 8	[2] 28	–	–	–	–	–	–
Asia:								
China	277	214	1	–	–	–	–	–
India	2,722	6,679	6,426	5,023	2,744	456	355	528
Indochina	–	685	–	–	–	–	–	–
Japan	–	216	9	13	–	–	–	–
Others	64	[2] 20	–	–	–	–	–	–
Africa:								
Mozambique	77	128	239	222	74	–	–	–
Others	–	[2] 61	9	43	–	–	–	–
South America:								
Brazil	66	332	1,338	4,966	2,852	13,920	8,726	6,442
Paraguay	–	–	73	96	284	–	–	–
Others	[2] 31	[2] 2	22	93	89	2	14	[3] 8
Total	22,044	20,771	–	–	–	–	–	–

[1] 1940-45 subject to revision.

[2] Less than a 5-year average.

[3] Incomplete.

Compiled from official sources.

Other countries of Asia producing and exporting castor-beans are the Netherlands Indies, Indochina, Iran, and Manchuria. The last-mentioned country ranks second in Asiatic and fourth in world production. Indications are that castor-bean production was increased during the war in most Japanese-occupied countries.

Production in Africa was practically doubled in 1945 chiefly as a result of acreage expansion and exceptionally high yields per acre in Madagascar.

TRADE

International trade in castor-beans is limited to a comparatively few countries, with Brazil and India the principal exporters. During the 1930's, Manchuria, the Netherlands Indies, China, and certain African countries made fairly large shipments. Argentina, Ecuador, Haiti, and other Latin American countries have also exported small quantities. (See table 35.)

The United States is by far the largest importer of castor-beans and has held that position since the end of World War I. The 1935-39 average was 66,500 tons, representing approximately 33 percent of world imports; by 1941, United States imports had reached 197,000 tons but have been smaller since that time owing to the shortage of shipping space and other conditions brought about by war.

The United Kingdom ranked second in imports of castor-beans during the 15-year period 1925-39. Other European countries and Japan were also significant importers. Italy's unusually large imports in 1940 originated chiefly in Brazil, and Japan's purchases on that market during 1938-41, ranging from 4,600 to 21,000 tons, placed that country second as an importer in 1941. (See table 36.)

International trade in castor oil is rather universal although small in volume. Exports are from countries producing castor-beans and those producing oil from imported beans. (See table 37.) Prior to 1939, the bulk of exports originated in European countries, where imported beans were crushed. The United Kingdom, Belgium, and France accounted for 70 percent of total world exports of castor oil during 1925-39. Many countries imported oil, but the quantity taken by each individual country was small. (See table 38.) As in the case of exports, the countries of Europe were the major importers, taking 80 percent of the amount that entered world trade. Germany held first place, with 35 percent, and the United Kingdom and Czechoslovakia followed, with 18 and 7 percent, respectively. During 1935-39, most of the countries of Asia, Africa, and North America were both exporters and importers of oil. Little information is available, however, regarding international trade since 1940. In succeeding years, Brazil has become an exporter of importance, whereas the United States and Canada have materially increased their imports of castor oil.

Table 38.- *Castor Oil: Imports into specified countries, averages 1925-29 and 1935-39, annual 1940-45*[1]

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
North America:								
United States . . .	196	113	25	934	984	10,116	7,736	825
Canada	[2] 760	1,136	1,806	3,270	3,635	3,232	3,332	5,460
Cuba	224	159	112	83	53	52	–	–
Others	27	164	16	22	22	12	–	–
Europe:								
Austria	488	[2] 516	–	–	–	–	–	–
Belgium-Luxemburg .	279	204	–	–	–	–	–	–
Czechoslovakia . .	1,716	1,036	–	–	–	–	–	–
Denmark	157	296	58	–	–	–	–	–
Eire	184	[2] 174	–	–	–	–	[3] 143	[3] 167
France	214	544	207	104	28	–	–	–
Germany	8,256	7,050	6,840	4,871	748	340	–	–
Hungary	302	[2] 203	–	–	–	–	–	–
Italy	55	[2] 192	254	104	136	[3] 64	–	–
Netherlands	920	716	[3] 2	–	–	–	–	–
Rumania	176	102	58	–	–	–	–	–
Sweden	–	1,868	–	–	–	–	–	–
Switzerland	524	918	–	–	–	–	–	–
United Kingdom . .	3,700	4,441	3,664	590	728	56	392	0
Others	[2] 32	[2] 167	68	18	16	83	–	–
Asia:								
Ceylon	189	169	113	154	–	–	–	–
Japan	284	395	67	220	24	–	–	–
Philippine Islands	–	84	73	–	–	–	–	–
Turkey	–	140	24	–	–	–	–	–
Others	–	[2] 109	21	–	–	–	–	–
Africa:								
Algeria	121	[2] 54	–	–	–	–	–	–
Egypt	510	470	420	277	265	126	288	205
Libya	–	[2] 190	–	–	–	–	–	–
Union of South Africa . . .	620	565	589	–	–	–	–	–
Others	[2] 167	[2] 424	62	–	9	–	–	–
South America:								
Argentina	276	28	80	2	4	133	446	–
Uruguay	88	80	202	[2] 43	–	–	–	–
Chile	94	61	2	4	34	–	–	–
Others	10	[2] 138	27	14	6	6	–	–
Oceania:								
Australia	–	106	–	–	–	–	–	–
New Zealand	184	148	199	176	–	–	–	–
Total	20,753	23,160	–	–	–	–	–	–

[1] 1940-45 subject to revision.

[2] Average of less than 5 years.

[3] Incomplete.

Compiled from official sources.

Table 39.- *Rapeseed: Estimated world production, by specified countries, averages 1925-29 and 1935-39, annual 1941-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Asia:							
China	–	[1] 2,737.0	[2] 2,515.0	[2] 2,433.0	[2] 2,674.0	[2] 2,736.0	[2] 2,192.0
India[3]	1,164.0	1,124.0	1,235.0	1,221.0	1,200.0	1,032.0	1,197.0
Japan	78.9	115.8	116.5	91.8	58.1	35.7	25.6
Formosa	–	1.1	–	–	–	–	–
Estimated total .	4,000.0	4,000.0	3,950.0	3,800.0	4,000.0	3,850.0	3,450.0
Europe:							
Germany	30.3	[4] 107.3	340.0	–	–	–	[5] 60.5
Rumania	30.2	50.2	[6] 15.6	[6] 16.2	[6] 16.3	–	[7] 5.0
France	29.0	[4] 13.2	12.9	30.3	130.0	90.0	95.0
Poland	27.0	[4] 60.7	–	–	86.2	–	–
Bulgaria[6] [8]	11.4	15.2	1.4	1.1	2.0	1.5	–
Hungary[9]	9.7	10.0	11.0	9.7	8.2	–	2.9
Netherlands	6.2	4.4	8.8	9.6	95.8	–	25.5
Yugoslavia	4.4	12.3	4.0	–	–	–	–
Czechoslovakia . .	2.8	[3] [4] 9.4	–	–	–	–	–
Austria	2.0	[3] [4] 1.8	–	–	–	–	–
Belgium	1.0	[3] [4] .1	(10)	.4	42.2	45.1	1.1
Sweden	(10)	(10)	1.7	3.3	23.5	36.9	–
Switzerland	(10)	(10)	–	1.5	4.5	12.6	–
Italy	–	[3] 2.2	–	–	–	1.6	4.0
Estimated total .	160.0	290.0	530.0	375.0	1,200.0	1,150.0	740.0
Western Hemisphere:							
Argentina	–	[3] [4] 23.1	31.0	17.1	14.0	–	–
Mexico	–	1.1	1.3	1.4	1.5	8.8	11.0
United States . . .	–	–	2.7	3.7	3.1	.9	2.1
Canada	–	–	–	–	1.4	3.3	6.0
Chile	–	–	1.6	1.0	1.0	1.0	1.0
Estimated total .	10.0	25.0	37.0	25.0	21.0	30.0	35.0
Soviet Union . . .	[4] 19.0	[4] 20.0	–	–	–	–	–
Estimated world total	4,189.0	4,335.0	4,535.0	4,215.0	5,235.0	5,045.0	4,240.0

[1] 1935 and 1936 only.

[2] Free China.

[3] Includes mustard seed.

[4] Less than a 5-year average.

[5] United States zone.

[6] Since 1940 production not comparable to prewar averages because of territorial changes.

[7] Excluding Bessarabia, northern Bucovina, and southern Dobruja.

[8] Since 1941 data for southern Dobruja included with Bulgaria.

[9] 1938-44 production not comparable to prewar averages because of territorial changes.

[10] Less than 50 short tons.

Compiled from official and trade sources.

RAPESEED AND OIL

SUMMARY

World output of rapeseed in 1945, estimated at more than 4.2 million short tons, was slightly smaller than the prewar 1935-39 average and approximately 15 percent less than the 1944 crop. China, by far the leading grower of rapeseed, produced over 50 percent of the world output in 1945, and India ranked second. In both countries, production was maintained without serious fluctuations during the war. In Europe, a tremendous expansion in acreage took place with the outbreak of war, and production, exclusive of the Soviet Union, rose from an average of only 290,000 tons in 1935-39 to an all-time high of approximately 1.2 million tons in 1943. In 1945 output was estimated at 740,000 tons, or approximately 17 percent of the world total. Rapeseed production in the Western Hemisphere, led by Argentina and Mexico, is insignificant by comparison.

OUTLOOK

During the immediate postwar years part of the expanded acreage of rapeseed in Europe may continue in view of the extreme shortage of fats and oils. As other oleaginous crops and substitutes become readily available, however, European production may be expected to decline in favor of competitive oils as happened after World War 1. Asiatic production of rapeseed will probably continue at comparatively high levels, depending primarily on the domestic demand and to a lesser extent upon the market in Europe and the United States. Before the war only about 3 percent of the world production of rapeseed entered world trade.

TYPES AND USES

Cultivated rapeseed of Europe is generally obtained from the plant, *Brassica napus*. In Asia, a great many related species are grown. In Argentina, *B. campestris* is the common type. Extracted crude oil varies in color from yellow to yellowish brown, or green, and has a characteristic odor and a somewhat pungent taste. Oil content of the seeds ranges from 30 to 45 percent. In China and India, rapeseed oil is used for illumination and edible purposes. In Europe, especially during the war, the oil entered the market for human consumption and to lesser extent as a lubricant. Of the small quantities utilized in the United States, those for lubricating purposes are most important. Smaller quantities are used in the production of synthetic rubber.

PRODUCTION BY REGIONS

Asia

China

More than half the world output of rapeseed is produced in China (table 39). Production of this oleaginous seed during the war was maintained at approximately prewar levels or around 2.5 million short tons annually. The total area of rapeseed under cultivation during these years was estimated at 9 million acres. The principal producing centers are in the Provinces of Szechwan, Kiangsi, Chekiang, Anhwei, and Hunan, which accounted for about three-fourths of the Chinese production. In most parts of China, the crop is planted in the fall and harvested in the spring.

India

India, the second ranking producer, grows on an average one-fourth of the world production of rapeseed. During the past decade, the annual output of rapeseed, including mustard seed, was about 1.2 million short tons. Rapeseed, like most other dry-land crops in India, is subject to fluctuations due to weather conditions. Almost half the rapeseed acreage is located in the United Provinces, and Punjab and Bengal also have significant areas. Prior to the war, India was the largest exporter of rapeseed, but exports have since been on a steady decline. The United Kingdom is the principal importer of Indian rapeseed.

Japan

The third largest prewar producer of rapeseed was Japan, although Japanese output contributed only around 3 percent of the world total. During the war production declined, reaching a low of only 25,600 tons in 1945. Of the acreages sown to various domestically grown oil crops, the area of rapeseed is surpassed only by that of soybeans. For many years Japan was a leading importer of rapeseed. Shipments have fallen off since the 1920's owing to increased cultivation in the home islands and, during the war, because of transportation difficulties. China has always been the principal foreign supplier. Before the war, Chinese rapeseed was commonly crushed in Japan. About one-third of the Japanese prewar oil output was exported, primarily to the United States. Domestic consumption of rapeseed oil averaged about 35,000 tons in 1935-39 and declined to around 8,000 in 1945.

Other Asiatic Countries.

The only other Asiatic countries of importance producing rapeseed in commercial quantities are Manchuria and Formosa. Most of the Manchurian production is consumed domestically, and only small amounts of oil are exported. The production of rapeseed in Formosa increased slightly during the war but amounted to only 1,600 tons in 1943.

Europe

Germany

In order to further Germany's self-sufficiency in fats and oils, the area cultivated in rapeseed expanded twelvefold from 12,300 acres in 1933 to 153,200 acres in 1938. With the outbreak of war and the curtailment of imports, the area increased to around 450,000 acres in 1941, with a resulting harvest of approximately 340,000 short tons. During the ensuing years production was further expanded, and Germany became by far the leading European producer of rapeseed. Its cultivation is widely scattered throughout Germany.

Rumania

Prior to the war, Rumania was one of the major European producers and exporters of rapeseed. In 1939, approximately 150,000 acres were planted to this crop, mainly in Dobruja and southern Bessarabia. Rapeseed ranked second to sunflower seed in total acreage devoted to oleaginous crops. During the war, however, the German plan of expanding rapeseed acreage in countries within its orbit did not augment the Rumanian area. Rumania occupied first place in Europe and second place in the world as an exporter of rapeseed during 1935-39.

France

During the inter-war period, the French rapeseed acreage showed a steady decline, falling from approximately 80,000 acres in 1920 to 18,750 acres in 1939. During the early part of World War 11, the acreage remained at low levels but rose abruptly in 1942 in accordance with the Government's policy of promoting oilseed production. In 1944, according to official estimates, there were nearly 400,000 acres under cultivation. The chief region producing rapeseed is central France. The bulk of the seed and oil is consumed domestically.

Poland

During the 1930's the Polish acreage of rapeseed was increased to about 130,000 acres in 1936, or twice the area cultivated during the 1920's. Since the major part of the Polish acreage was located in the area under German control, the occupational government was able to effect some increase. The major part of the Polish production prior to the war was consumed domestically.

Bulgaria

Although the area planted to rapeseed in Bulgaria was subject to extreme fluctuations before the war, it was expanding during the late 1930's. In 1938 approximately 52,500 acres were reported to be planted in rapeseed, or about 7 percent of the total area of all oilseeds cultivated in Bulgaria. With the outbreak of war and the subsequent occupation of the Balkans, the Bulgarian acreage declined rapidly, dropping to less than 8,000 acres in 1944. During the two decades prior to the war, most of the Bulgarian rapeseed production was exported, mainly to Italy, Netherlands, and the United Kingdom. With the development of a domestic oil-extracting industry in the late 1930's, two-thirds of the production was crushed and consumed within Bulgaria, and only one-third was exported.

Netherlands

Because of the intensive dairy industry in the Netherlands, there has always been a need for oil cake and meal. Since the domestic production of rapeseed supplied only part of the demand, the Netherlands was a substantial importer before the war. The processed oil was consumed principally by the margarine and soap industries. During the war, the cultivation of rapeseed was encouraged by the German occupational government. As a result, the area devoted to rapeseed increased from a prewar average of around 5,000 acres to 120,000 acres in 1943 but dropped sharply during 1945. During the spring of 1946 only 14,017 acres of rapeseed were sown owing to increases in the acreages planted to grains, potatoes, and sugar beets.

Other European Countries

Before the war, the Yugoslav rapeseed acreage increased from 4,000 acres in the early 1920's to an average of around 40,000 acres in the late 1930's. During the war, the area under cultivation dropped below 20,000 acres, and production probably averaged no better than 4,500 short tons. The proposed rapeseed area for 1946 was about 57,000 acres. The bulk of Yugoslav production has always been consumed domestically.

The acreage of rapeseed in Hungary varied from 17,000 acres to more than 35,000 acres during the 1930's. A relatively high acreage level was maintained under German administration during the early war years. By 1945, however, rapeseed production had declined to only 2,900 short tons. Before the war, about half the Hungarian rapeseed crop was exported.

Czechoslovak and Belgian acreages and production of rapeseed greatly increased under German control. The greater part of the Czechoslovak output is believed to have been shipped to Germany. In Sweden and Switzerland rapeseed acreages expanded at the outbreak of war. Over half the total 1944 oilseed area of Sweden was in rapeseed, the acreage of which rose from about 30 acres in 1940 to around 50,000 in 1944. The Swiss rapeseed acreage almost paralleled the phenomenal Swedish rise, increasing from approximately 90 acres in 1940 to nearly 17,500 acres in 1944. Compared with most other European countries, Italian production of rapeseed has been insignificant. During the 5-year period 1935-39, Italy was second in Europe to the United Kingdom as an importer of rapeseed.

Soviet Union

The Soviet acreage and production of rapeseed decreased during the war. In 1938, approximately 170,000 acres were under rapeseed cultivation. The Ukraine accounts for practically all the crop. Compared with sunflower, cotton, and flax seed, however, the three major oilseeds produced in the Soviet Union, rapeseed is unimportant. In 1933 the Soviet Union had completely dropped out of the rapeseed-export picture.

Western Hemisphere

United States

Although rapeseed is not an important source of vegetable oil in the United States, commercial cultivation of this crop was inaugurated within the past 6 years, when imports fell off. Production increased from an estimated 500 tons in 1940 to 3,700 in 1942; in 1944, it fell to 900 tons but increased to 2,100 tons in 1945. Most of the United States' rapeseed is grown in the State of Idaho. All the seed commercially produced is of the Dwarf Essex variety.

Other Countries

Argentina has been the leading grower of rapeseed in the Western Hemisphere, although production declined somewhat during the war years. The larger part of the Argentine crop usually is exported. Cultivation of rapeseed in Mexico expanded during the war, although the total acreage is considered unimportant as compared with the area planted to sesame and other oilseeds. Apart from the cultivated crop, varying amounts of rapeseed are collected from wild plants. Almost all the Mexican output is consumed domestically.

Commercial cultivation of rapeseed in Canada began during the war, although the acreage devoted to this crop was comparatively insignificant. Saskatchewan and

Table 40.-*Rapeseed: Exports by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
India	103.2	25.4	[1]4.0	[1]3.8	[1]3.9	[1]2.0	[1]1.9	[1]1.9
China	64.8	19.5	8.8	2.0	–	–	–	–
Poland	11.4	[2]1.5	–	–	–	–	–	–
Bulgaria	11.3	6.0	4.0	–	–	–	–	–
Rumania	5.8	23.4	–	–	–	–	–	–
Hungary	6.4	4.5	–	–	–	–	–	–
United Kingdom	5.5	1.4	–	–	–	–	–	–
Netherlands	3.5	3.8	–	–	–	–	–	–
Germany	3.5	[2].2	–	–	–	–	–	–
Argentina	1.6	17.7	15.2	10.1	14.8	5.3	2.7	–
Japan	[3]1.2	1.8	.6	.0	0	0	0	0
Czechoslovakia	.3	(4)	–	–	–	–	–	–
Belgium	.1	.6	–	–	–	–	–	–
France	.3	(4)	–	–	–	–	–	–
Estimated world total	225.0	110.0	60.0	–	–	–	–	–

[1] Year ending March 31. [2] 4-Year average. [3] Includes mustard-seed oil. [4] Less than 50 tons.
Compiled from official and trade sources.

Manitoba Provinces produce the bulk of the Canadian rapeseed. The only other producer of importance in the Western Hemisphere is Chile, where small amounts of rapeseed are derived from wild sources. Chilean imports of rapeseed were second only to those of sunflower seed in recent years.

TRADE

Less than .5 percent of the annual world production of repeseed entered international trade during the prewar period 1935-39. India, Rumania, China, and Argentina

Table 41.-*Rapeseed Oil: Exports by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Japan	13.4	18.9	3.4	0.3	0.1	0.1	–	–
Argentina	–	–	–	–	–	–	8.6	11.3
India	[1]1.4	[1]1.4	–	–	(2)	(2)	(2)	–
Netherlands	1.1	.7	–	–	–	–	–	–
United Kingdom	.5	1.4	–	–	–	–	–	–
Hungary	.6	.3	–	–	–	–	–	–
Rumania	–	[3]1.5	–	–	–	–	–	–
France	.3	.2	–	–	–	–	–	–
Bulgaria	–	.2	–	–	–	–	–	–
Belgium	–	.7	–	–	–	–	–	–
Manchuria	–	[4].2	–	–	–	–	–	–
Germany	–	.1	–	–	–	–	–	–
Estimated world total	22.0	30.0	–	–	–	–	–	–

[1] Includes mustard-seed oil. [2] Less than 50 short tons. [3] 4-year average. [4] 1938 only.
Compiled from official and trade sources.

Table 42.-*Rapeseed: Imports by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Japan	63.6	20.5	16.4	21.6	18.4	13.5	5.8	7.6
Italy	53.7	20.3	2.2	.3	–	–	–	–
Germany	31.3	[1] 4.4	–	–	–	–	–	–
United Kingdom	30.0	[1] 27.3	–	–	–	–	–	–
Netherlands	18.3	7.4	–	–	–	–	–	–
Czechslovakia	6.5	[1] 1.5	–	–	–	–	–	–
Sweden[2]	6.2	1.7	.5	.5	.3	1.4	5.8	–
United States	4.3	8.0	2.5	1.8	.7	1.2	.2	.5
Belgium	3.7	5.1	13.6	.3	.5	3.7	–	–
France	2.6	[1] 2.6	–	–	–	–	–	–
Australia[2]	1.7	1.2	–	–	–	–	–	–
Norway	1.0	[1] .9	–	–	–	–	–	–
Korea	.8	[1] 1.0	–	–	–	–	–	–
Denmark	.6	~~1.2~~	.5	–	–	–	–	–
Chile	–	–	–	4.4	9.0	9.1	–	–
Estimated world total	235.0	110.0	–	–	–	–	–	–

[1] 4-year average. [2] Includes small amounts of other oleaginous seeds

Compiled from official and trade sources.

shipped approximately 80 percent of the yearly world export of approximately 110,000 short tons; Bulgaria, Hungary, and the Netherlands supplied the bulk of the remainder (table 40). The United Kingdom, Japan, and Italy were the principal markets for the seed (table 42).

Rapeseed-oil shipments during 1935-39 averaged only 30,000 tons, the greater part of which were exported by Japan (table 41). Japanese mills crushed the seed, imported mainly from China, and exported the oil to the United States and Europe (table 43).

During the war the United States derived most of its rapeseed requirements from Argentina. German imports came from occupied European countries, and the United Kingdom depended on India for the bulk of its rapeseed requirements.

Table 43.-*Rapeseed Oil: Imports by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
United States	8.8	14.5	6.5	8.7	13.4	9.0	11.0	8.9
United Kingdom	5.8	[1] .5	–	–	–	–	–	–
Germany	–	[1] 6.3	–	–	–	–	–	–
Korea	–	[1] 1.8	–	–	–	–	–	–
Netherlands	.7	.5	–	–	–	–	–	–
Norway	–	[1] .7	–	–	–	–	–	–
Sweden	–	.5	–	–	–	–	–	–
Australia	.3	.4	–	–	–	–	–	–
France	.3	(2)	–	–	–	–	–	–
Canada	–	(2)	.3	.6	1.3	.5	.3	–
Belgium	.2	.2	.1	(2)	(2)	.3	.3	–
Estimated world total	20.0	28.0	–	–	–	–	–	–

[1] Less than 50 short tons. [2] 4-year average.

Compiled from official and trade sources.

TUNG NUTS AND OIL

SUMMARY

Tung oil, also referred to as China wood oil, is considered one of the most valuable drying oils. With China, the world's foremost producer, cut off from export trade in recent years because of war, supplies moving into international trade have been very limited. Other countries, such as the United States and Argentina, have developed fairly significant tung industries, but their combined output is only a small percentage of the world production. High wartime prices, however, have fostered the industry in the United States, Latin America, and Africa. In time, the other producing countries may also offer competition to China for the world markets.

OUTLOOK

Only about 25,000 tons of tung oil are expected to be shipped from China during 1946. War-torn China needs time to reestablish transportation and rehabilitate its economy before it can again export tung oil in volume. This oil in the postwar period probably will encounter considerable competition from substitute drying oils, particularly dehydrated castor oil. Until a stable and continuous supply of tung oil is available, industrial users may be reluctant to change their consumption pattern of drying oils. Furthermore, tung oil must be low enough in price - within a few cents - to compete with other drying oils. Probably China and other producing countries may eventually be able to place tung oil on the world market at a price which will result in a larger utilization in the postwar period that was experienced in prewar years.

USES

Because of its unique drying properties, tung oil has been a valuable ingredient in paints and varnishes, and the bulk of the oil has been consumed in preparing those products. Tung oil is also used in the manufacture of linoleum and oilcloth; in waterproofing textiles and military equipment, in printing ink, electrical goods, and in other peacetime and wartime essential articles.

Botanically, the true tung tree is classified as *Aleurites fordii*. Seeds of this species yield the greater part of the nuts that are crushed for commercial tung oil. The tree is indigenous to central and western China and tolerates cool weather and frosts fairly well. The *Aleurites montana*, a closely related species native to southern China, is adapted to a warmer climate. The resulting oil from this species is practically identical with that obtained from *A. fordii*, and commercially there is no distinction between them.

PRODUCTION BY REGIONS

Asia

China has grown and exploited tung trees for a number of centuries and continues to be the outstanding producer of tung oil. The trees grow primarily in the Provinces of Szechwan, Hunan, Chekiang, and Hupeh and to some extent in other Yangtze Valley Provinces. The *Aleurites fordii*, the more hardy species, represents over 80 percent of the total number of trees in China. In south China, principally in Kwangsi Province, the *A. montana* is extensively grown.

Unofficial estimates have placed the average 1938-41 production of tung oil in China at around 150,000 short tons. For generations no systematic plantings occurred. Farmers planted the trees on uncultivated land, along roadsides and hillsides, giving little, if any, thought to their cultivation. The production of tung nuts in most areas is regarded as a minor enterprise - the quantity gathered provides an additional cash income to farmers.

Production of tung oil will be below the prewar average for several years. During the Japanese occupation, few new plantings of tung trees were made and many of the old trees were cut down for firewood, or were disposed of in some other way. Labor and transportation costs for collecting and processing the nuts are high so that there is little incentive to revive the industry.

For some years before the war, the Chinese National and Provincial Governments had been encouraging an increase in tung acreage. Further stimulation was given this movement in 1938, when the Chinese Government obtained a loan from the United States to be repaid in the form of tung oil.

In China, tung oil has been used for generations for calking and painting the thousands of Chinese boats. Further, it is employed in waterproofing textiles and paper and varnishing leather. When calcinated, the oil is used in ink making. Fairly widespread use of tung oil has occurred in native medicines for external use.

For several decades the adulteration of tung oil in China was a problem. It was not uncommon for this oil to be mixed with poppy-seed or tea-seed oil. In the winter months, tung nuts were crushed with other vegetable oilseeds. Also, such materials as rice straw and tung-nut dust were mixed with the oil in order to increase its weight. The Chinese Government established an inspection service in 1929, but its standards were too low in the eyes of foreign consumers. After the outbreak of Sino-Japanese hostilities in 1937, tung oil was taken over as a Government monopoly. Whether or not this monopoly will function in the postwar years is not known.

Annual tung-oil exports from China during 1933-37 averaged 89,100 short tons, of which about 70 percent went to the United States and about 30 percent elsewhere, mostly to European countries.

In Malaya and Ceylon experiments with tung have not been successful. The acreage set out in Burma appears to have met with better success. Here the soil and climate are similar to those of Kwangsi and Yunnan Provinces in China. Around 8,500 acres are believed to have been planted by 1940. In the early part of this century Indochina exported around 5,000 tons of tung oil annually. Thereafter exports diminished because of adulteration and generally poor quality of the oil. Steps toward the rehabilitation of the industry began in 1932, and by 1938 exports amounted to 900 tons. The Indochina tung industry is organized on a basis similar to that of the Chinese enterprise. Yearly tung-oil production in Japan during 1935-39 averaged 584 tons. The output during the war fell to about half this amount.

United States

Tung-oil production in 1946 in the United States is forecast at from 10 to 11 million pounds, compared with 8.6 million pounds in 1945. Such a volume makes this country and the second ranking producer.

The first tung plantings in the United States were made in 1905 on an experimental basis. Commercial production of the oil is a relatively new industry. The first mill was established in 1928. Production has increased rapidly during the past few years. The domestic crop, however, did not furnish an appreciable part of the United States consumption until about 1940, when the increased production coincided with drastic reduction of imports. The area of commercial production extends from central Florida to southeast Texas in a belt about 100 miles in width along the Gulf of Mexico. In the six States of this area (Florida, Alabama, Georgia, Mississippi, Louisiana, and Texas), the industry expanded from 351,000 trees in 1929 to 12,671,000 in 1940. Mississippi is the most important producing State.

Production of unhusked air-dried nuts in 1945 was estimated at 33,100 tons, compared with 26,680 tons in 1944. In 1939, 1941, and 1943, the industry's output was reduced by spring frosts.

American tung oil is generally superior to that produced in China, and in prewar years brought a premium of from 2 to 4 cents a pound over the imported commodity. The average 1935-39 domestic disappearance of tung oil was 118 million pounds a year. With imports from China cut off as a result of war, domestic disappearance in 1943 was only 8.3 million pounds and in 1944, 9.6 million pounds. Consumption in 1946 may reach 20 million pounds, depending upon arrivals from China.

Latin America

Argentina is the leading producer of tung nuts in Latin America. Plantings of tung trees have increased ffom 492,650 in 1937 to 10,354,651 in 1944. In terms of acreage, this means that around 160,000 acres are under cultivation. Over 87 percent of the plantings have been set out since 1941, 40 percent during 1944 alone. When the trees on all 160,000 acres reach bearing age, if they yield 1 ton of nuts per acre, Argentina will have a potential tung-oil production of about 25,000 short tons.

Because of the recent expansion in acreage, the 1945 dried-tung-nut harvest is estimated at about 16,500 short tons, or the equivalent of 2,300 tons of oil. Local consumption, also increasing, is now from 400 to 500 tons of oil. Tung growing, a relatively new industry in Argentina, is confined to the extreme northeastern part of the country, with about 97 percent of the plantings in the Territory of Misiones and the remainder in the Province of Corrientes.

The cultivation of tung trees in Brazil was introduced into the State of São Paulo in 1930 by a private company. The State Secretariat of Agriculture also obtained seed in 1931 from China and the United States. With strong support from the Agricultural Institute at Campinas and the Experimental Station at Piracicaba, the planting of tung trees was expanded considerably in the 1930's. In more recent years, tung groves have been set out in other southern States, including Paraná, Santa Catarina, and Rio Grande do Sul.

No information is available on the number of tung trees growing in Brazil, but reports state that there are no less than 2 million trees of all ages in the States of São Paulo and Paraná. In Paraná, many coffee growers have planted tung between rows of coffee trees. The reason for their interest in tung trees is that these will yield some income if freezing weather should destroy the coffee crop.

Trade estimates for dried-tung-nut production in Paraná for the past 3 years have ranged from 500 to 900 tons. The tung-nut output in Rio Grande do Sul totaled 417 tons in 1944 and 288 tons in 1943.

Production of tung oil is recorded in official statistics only since 1940. In that year 57 tons were produced in São Paulo. In 1944 a total of 108 tons was produced, 82 tons in São Paulo and 26 tons in Rio Grande do Sul. Because of the good tung harvest in 1946, it is likely that Brazil may have an exportable surplus of 200 tons of tung oil this year.

Another drying oil prepared from the seed of a tree similar to tung, known as *iguape*, has been produced in limited quantities in Santa Catarina and Paraná for a number of years. This tree is classified as ***Aleurites moluccana***. Production of iguape-nut oil amounted to 83 tons in 1944 as compared with the prewar average of 62 tons. Maximum production was attained in 1940, when 111 tons were produced.

In Chile plans have been made to plant tung trees on an experimental basis. The first attempt to introduce tung to Paraguay was made in 1928 in Sapucay. By the mid-1930's there were more than 30,000 trees planted, some of which were in bearing stage. The belief is, however, that no great increase in acreage has occurred since that time. Cuba has completed some experimental work of the growing of tung trees.

Africa

Tung trees were first planted in the Union of South Africa in 1923. In 1944, a total of 230,000 trees were reported to have been planted, mostly in Natal, Transvaal and Swaziland. In 1938 more than 2,000 acres had been set out in Nyasaland, and a considerable expansion has occurred there since 1941. Other plantings in Africa have taken place in Tanganyika, Kenya, and Belgium Congo.

Soviet Union

Production of tung nuts in the Soviet Union is concentrated in Georgia in the Black Sea region. More than 32,000 acres of tung trees are believed to have been in cultivation in 1945, from which the production of nuts in that year totaled around 10,000 short tons. Two species of tung have been planted, most of which are ***A. fordii*** and the remainder, ***A. cordata***.

Oceania

By 1936-37 New Zealand had planted a total of 5,577 acres of tung trees. These plantings were not successful, and by 1941-42 all but 29 acres had gone out of production, apparently as a result of poor soil and weather conditions. The first planting of tung in Australia took place in 1926 in New South Wales. In 1934, the first commercial quantities of tung oil were obtained. In 1943-44 New South Wales had about 100 acres planted; other smaller acreages existed in Queensland and Western Australia.

TRADE

The important exporter of tung oil to date has been China, from which country the oil was first shipped to the United States in 1869. About 1875, the United States discovered the valuable drying qualities of tung oil. Chinese exports subsequently increased, but the real expansion came after 1900.

Before the Japanese invasion of China in 1937, the United States imported 70 percent of China's total exports. At the end of that decade, primarily as a result of a United States loan, the percentage going to the United States increased slightly. (See table 44)

In Europe, Germany was the leading consumer, followed closely by the United Kingdom. Other European markets included the Netherlands, Norway, Denmark, Italy, and France.

In the postwar years the United States will probably consume its entire domestic production of tung oil and require substantial imports. Small quantities will be available for shipment from Argentina and, perhaps, from Brazil. Indochina and Burma will also export small quantities.

Table 44.-*Tung Oil: Exports from China, by countries of destination, averages 1925-29 and 1933-37*

COUNTRY	AVERAGE 1925-29	AVERAGE 1933-37
	Short tons	*Short tons*
United States	43,918	59,481
Europe:		
Great Britain	4,211	4,153
Germany	3,076	3,341
France	1,203	3,517
Netherlands.	1,901	2,541
Italy	349	396
Denmark	252	788
Belgium-Luxemburg	195	413
Sweden	137	437
Norway	115	560
Asia:		
Hong Kong	[1]6,393	11,341
Japan and Formosa	640	898
Others	376	1,265
Total	62,766	89,131

[1] For reexport to other countries.

Compiled from official sources.

OITICICA SEED AND OIL

SUMMARY

Production of oiticica oil in Brazil for 1946 is forecast at 15,000 short tons, compared with 13,200 tons in 1945 and the 5-year 1935-39 average of 6,340 tons. Exports of oiticica oil totaled 12,960 tons in 1945, compared with 4,300 in prewar years. (See table 45.) When Chinese tung oil was cut off, as a result of the Sino-Japanese conflict, increased production of oiticica oil was fostered. Following a year of good growing conditions, a record production of 20,000 short tons of oil was reached in 1941. Production for several years thereafter was greatly reduced by unfavorable weather, lack of labor, and inadequate transportation facilities, but in 1945 and 1946 its upward trend was resumed.

Table 45.-*Oiticica: Production and exports of seed and oil, average 1935-39, annual 1940-46*

PERIOD	PRODUCTION		EXPORTS OF OIL
	SEED	OIL	
	Short tons	*Short tons*	*Short tons*
Average:			
1935-39	[1]21,700	6,340	4,292
Annual:			
1940	32,594	8,620	7,975
1941	44,732	20,052	18,305
1942	14,145	353	1,186
1943	7,108	1,252	1,071
1944	44,100	8,825	7,048
1945	—	[2]13,200	12,980
1946	—	[3]15,000	—

[1] 3-year average.

[2] Unofficial estimate.

[3] Unofficial forecast.

Compiled from official sources.

Brazil consumption of oiticica oil is currently estimated at 2,000 tons per year. Combined with dehydrated castor oil, it is substituted, to some extent, for linseed oil in local paint manufacture. Brazil is increasing the consumption of oiticica oil and in the future may limit the amount of the exportable surplus.

USES

Like tung oil, oiticica has many industrial uses. It is primarily consumed by the paint and varnish industry, but it also serves in the manufacture of linoleum and printing inks. Furthermore, it is utilized for metallic soap, moisture proofing, pressed-fiber boards, and for automobile-brake bands. In certain rubber products it improves the elasticity. In Brazil the natives have utilized oiticica oil as fuel for lamps and, mixed with resins, for calking boats.

PRODUCTION

The oiticica tree is a native of northeastern Brazil. It is found growing along alluvial river banks of the States of Ceará and Rio Grande de Norte and to a lesser extent in Paraíba and Piauí. No estimates are available as to the number of trees, although several sources have indicated that they may exceed several million. As yet, all the production comes from wild trees. No commercial plantations have been established.

Historically, it appears that in 1867 a German monk, a member of a scientific expedition to northeastern Brazil, first suggested that oiticica oil might serve a useful purpose in industry. The initial interest in oiticica declined, however, when no suitable method of refining the oil was found. Interest in this commodity was not again developed until World War I. Again the development waned. In 1927, a new extraction plant for oiticica was established in Rio de Janeiro. Two years later a similar plant was built at Fortaleza. Interest in the industry continued, and increasing expansion took place during the 1930's.

The tree, classified as *Licania rigida*, Benth, grows relatively slowly and does not begin to bear until the seventh year. It begins to bloom in September, and the seeds are ready for harvest 3 or 4 months later. In normal years the average yield per tree is over 300 pounds. Harvesting usually lasts from December through April. As this is the rainy season in Brazil, many nuts rot on the ground because of excess moisture. The oil content of the seed varies from 55 to 62 percent. Brazil is the only country that reports the production of oiticica seed and oil on a commercial scale.

TRADE

Exports of oiticica oil in 1945 totaled almost 13,000 tons as compared with the 1935-39 average of only 4,292 tons. A large percentage of the exports originate at Fortaleza, where most of the crushing plants are located, although substantial quantities also come form the State of Paraíba. Since 1941 the United States has taken almost all the available oiticica oil. The prewar markets were largely confined to the United States, Germany, Great Britain, the Netherlands, and France. At the close of 1945, the export price for raw oiticica oil, f.o.b. Fortaleza, was 21.5 cents per pound. Because of the scarcity of drying oils in recent years, current prices of oiticica oil are almost double those of prewar years.

PERILLA SEED AND OIL

SUMMARY

The world production of perilla seed in 1945 is believed to have been appreciably smaller than the estimated 200,000-short-ton annual output during 1935-39. Asia supplies almost all the perilla produced in the world. Manchuria contributes over two-thirds of the total, and China, India, and Korea account for most of the remainder. Japan has always been the leading purchaser of Manchurian perilla seed. Prior to the war, the United States was the largest importer of perilla oil, which came largely from Manchurian seeds crushed in Japan. The postwar perilla situation narrows down to the production outlook in Manchuria and the demand for perilla as a drying oil, primarily by industries in the United States.

TYPES

Only one species, *Perilla frutescens* (L.) Britton (*P. ocymoides* L.), and a variety of that species, *P. frutescens nankinensis* (Decaisne) Bailey, are grown commercially in India, Japan, and China. The average oil content of the seeds usually varies from 35 to 45 percent. Crude perilla oil is deep yellow or green in color. When dried, it produces a shiny, impermeable, hard layer.

USES

In Europe and the Orient, perilla oil is sometimes used for food, but it is more important for industrial purposes. Because of its excellent drying properties, perilla oil is used in the United States in the manufacture of paints, varnishes, linoleum, and other similar products. In 1936, perilla oil represented about 13 percent of the total quantity of drying oils consumed in the United States. The consumption of this oil was, thus, only slightly less than that of tung and one-fifth as great as the industrial consumption of linseed oil. In Japan, perilla oil was used in manufacturing paper umbrellas, oil paper, artificial leather, printer's ink, paint, varnish, and lacquer.

PRODUCTION

Manchuria produces around 70 percent of the world production of perilla seed. The area under cultivation averaged 405,000 acres during 1935-39 and production, approximately 135,500 short tons. The bulk of the crop is grown in the Provinces of Lungkiang and Pinkiang. The domestic consumption of perilla seed and oil is small. Virtually the entire output is exported. The oil-crushing mills are located in Dairen, where about 40 percent of the seed production is crushed for export.

Japan depended heavily upon the Manchurian crop, since only small amounts of perilla seed were produced domestically. During 1935-39 an average of 19,300 short tons were produced in Japan, but the crop declined during the war. Korea, China proper, India, and the Soviet Union are the only other producers of perilla seed, although the combined output of these countries does not equal Manchurian production. During the 1930's, the area sown to perilla in Korea was relatively constant and averaged around 30,000 acres. Production during 1935-39 averaged around 5,200 tons. The area planted to perilla in the Soviet Union is reported to have increased from approximately 500 acres in 1930 to over 60,000 acres in 1935. The chief producing areas are in Northern Caucasus, Ukraine, Transcaucasia, and the Soviet Far East.

TRADE

Prior to the war, international trade in perilla seed and oil was carried on primarily among three countries: Manchuria, Japan, and the United States. Manchurian exports of seed, averaging 77,500 tons in 1935-37, were marketed almost exclusively in Japan; whereas oil shipments from both Japan and Manchuria, approximating 18,000 and 14,000 tons, respectively, during this 5-year period, were absorbed almost entirely by the United States. Imports of perilla oil into the United States fell from an average of 32,000 tons in 1935-39 to less than 7 in 1945. As a rule, perilla seed is not imported by this country.

Table 46. - *Lard (Including Unrendered Pork Fats):*[1] *Estimated world production by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

CONTINENT AND COUNTRY	AVERAGES 1925-29	AVERAGES 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Western Hemisphere:								
United States[2]	1,154.1	815.0	1,171.5	1,140.5	1,234.5	1,528.0	1,601.7	1,065.9
Brazil	71.5	[3]66.0	–	–	–	–	–	
Canada	40.4	32.0	40.7	46.3	50.0	63.0	60.0	–
Mexico	20.0	25.0	27.0	30.0	32.0	30.0	30.0	30.0
Argentina	–	10.0	11.0	15.0	25.0	35.0	45.0	60.0
Cuba	–	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Chile	–	2.3	2.3	2.4	2.7	2.7	2.8	3.0
Ecuador	–	1.0	1.2	3.0	1.8	1.6	–	–
Colombia	–	–	15.0	16.3	19.2	20.1	–	–
Guatemala	–	–	–	3.3	3.7	4.3	–	–
Estimated total	1,300.0	960.0	–	–	–	–	–	1,350.0
Europe:[4]								
Germany	[3]330.0	[3]397.0	–	–	–	–	–	95.0
Italy	165.4	[5]171.0	150.0	170.0	173.0	165.0	130.0	100.0
France	–	[5]151.0	–	–	–	–	–	67.0
Poland	–	[5]123.0	–	–	–	–	–	–
Hungary	–	110.0	–	–	–	–	–	15.0
Yugoslavia	–	75.0	–	–	–	–	–	–
Spain	–	[6]73.0	–	–	–	–	–	55.0
Czechoslovakia	–	65.0	–	–	–	–	–	33.0
Netherlands	–	[5]63.0	–	–	–	–	–	13.0
Austria	–	[5]49.0	–	–	–	–	–	10.0
United Kingdom	20.0	45.0	–	–	–	–	–	–
Rumania	–	39.0	–	–	–	–	–	–
Belgium	–	[5]38.0	–	–	–	–	–	11.0
Portugal	–	[5]27.0	–	–	–	–	–	18.7
Denmark[7]	14.5	[5]23.5	12.1	7.8	4.2	8.2	11.2	12.0
Bulgaria	–	11.0	–	–	–	–	–	–
Sweden[7]	–	10.0	–	–	–	–	–	11.0
Switzerland[7]	–	7.7	6.6	4.4	4.4	3.3	3.3	3.3
Eire[7]	–	2.8	–	2.2	.9	.5	–	–
Finland[7]	–	3.3	–	–	–	–	–	1.1
Estimated total	1,100.0	1,500.0	–	–	–	–	–	700.0
Asia, Africa & Oceania:								
China	–	–	–	–	–	–	–	–
Australia	1.4	1.6	1.6	1.8	2.0	2.0	–	–
Japan	–	1.2	1.0	1.1	.4	–	–	–
Madagascar	–	1.0	1.0	1.0	.7	.6	.4	–
Union of South Africa	.5	.7	–	–	–	–	–	–
New Zealand	.5	.5	.5	.6	.6	–	–	–
Estimated total	200.0	200.0	–	–	–	–	–	–
Soviet Union	–	[8]340.0	–	–	–	–	–	–
Estimated world total	2,900.0	3,000.0	–	–	–	–	–	2,400.0

[1] In Europe unrendered pork-fat production exceeds that of lard. [2] Does not include fat backs and other forms of unrendered pork fat. [3] 2-year average. [4] Data for July-June years. [5] 1933-37 average. [6] Average 1931-35. [7] Rendered portion. [8] 1938 estimated hog fat.

Compiled from official and trade sources.

LARD

SUMMARY

Practically every nation produces lard and unrendered pork fat in some quantity. The most notable exceptions are among certain countries in Asia and North Africa where religious prejudices do not favor either production or consumption. World output of lard, including pork fats, during 1935-39, averaged 3 million short tons. (See table 46.) The 1945 output is believed to have been approximately 20 percent less owing to the decline in production in Europe, China, and the Soviet Union, even though output increased in the Western Hemisphere.

Of the world estimate of nearly 250 million hogs in 1945, the United States possessed almost 25 percent of the total. European hog numbers in 1945 are estimated at about 65 percent of the prewar 1936-40 estimated average. On the other hand, hog numbers increased during the war in the United States, Argentina, Canada, and Mexico.

The United States is by far the principal lard-producing and lard-exporting country of the world. The production of commercial lard, inspected and non-inspected, reached a peak level in 1944 and totaled over 1.6 million tons.[1] Of this amount about 30 percent was exported. During 1935-39, Germany was the second ranking lard producer in the world, and Europe had a larger output than the Western Hemisphere. Other significant European producers were Italy, France, Poland, and Hungary.

Perhaps the most phenomenal rise in output during the war years occurred in Argentina. The commercial-lard output reached 60,000 tons in 1945 as against 11,000 tons in 1940. Production is on an export basis, since not more than 10 percent of the lard output is consumed domestically.

OUTLOOK

European lard output, lowered by smaller hog numbers and lesser hog weights, probably will not recover to prewar levels for some years. The rate of recovery will depend largely on prices and quantities of available feedstuffs. United States lard production, which declined in 1945, probably will not fall below 1 million short tons on the average. This will depend largely on the price of corn and on the market demand for pork and lard. The 1946 Argentine production of lard is expected to be lower than in previous years owing to a decrease in hog numbers, a result of high-priced feed. The long-range outlook of the lard industry is also contingent on the availability and prices of substitute fats and oils. Before the war, lard encountered strong competition in many countries from margarine and shortening made from vegetable and whale oils.

TYPES AND USES

Lard types depend on the cut of the meat from which it is derived and the method employed in rendering it. The bulk of the lard produced in the United States is prime steam lard, which is manufactured from all the fatty portions of the hog considered edible, except "leaf" fat, and which is rendered usually by a wet process in closed tanks under steam pressure. Ordinary lard is sometimes produced by a dry rather than a wet rendering process. Dry-rendered lard is used for the same purpose

1. Does not include fatbacks and other forms of unrendered pork fat.

as wet, although it is usually darker in color than prime steam lard and has a "cooked" flavor. Leaf lard refers to dry-rendered lard from hard internal fat. Natural lard comes from selected stock wet-rendered at a low temperature and has a mild flavor that is desirable for margarine. In recent years, however, neutral lard has given way to hydrogenated vegetable and whale oils for margarine.

The United States lard destined for export conforms with trade demands in packaging and quality. A common practice is to stiffen steam lard for export by the addition of hydrogenated lard stearine. Lard for shipments to the Tropics is made exceptionally hard so that it may withstand heat. In many countries, especially in Europe, unrendered pork fat is used for drying and as an ingredient in certain dishes. Lard oil is used in some localities for cooking purposes, also as an illuminant and as a lubricant.

PRODUCTION BY REGIONS

Western Hemisphere

United States

During the past two decades, estimates indicate that the United States produced from 50 to 75 percent of the world's total lard output, excluding China and the Soviet Union, and ranked first among the lard-exporting nations. Lard production reached a peak of approximately 1.6 million short tons in 1944 as compared with an average of 815,000 tons in 1935-39. Hog numbers almost doubled the prewar average, reaching almost 84 million head in 1944. Heavy declines took place in both hog numbers and lard output in 1945; they approximated only 60 million head and 1.1 million tons, respectively. These decreases reflect the smaller supplies and higher prices of feedstuffs.

Canada

In comparison with the United States, Canada has not been a large producer or consumer of lard. For 20 years before the war, lard production averaged about 35,000 tons annually. During the war the Dominion's output was stimulated. It reached a high of 63,000 tons in 1943, although lard production did not keep pace with the enormous increase in hog output, since Canadian hogs are predominantly of the bacon type. The production of lard per hog in Canada is about half that in the United States. The per capita consumption rose from 3.9 pounds in 1935 to 10.5 pounds in 1944, when substitutes were in short supply.

Before 1924 small import balances were shown for lard during most years, but since that time, until the war years, Canadian production usually has been in excess of domestic requirements. The volume of exports has not been large, however, even during the war years. The United Kingdom is the predominant market for Canadian lard; Newfoundland and the British West Indies offer smaller outlets.

Mexico

Although no official statistics are available, estimates of lard production in Mexico indicate a steady increase during the past two decades. In 1945, the output was placed at about 30,000 short tons. The number of hogs in Mexico was calculated at 6 million head during 1944, a sizable increase over prewar estimates. Although lard is preferred as a cooking oil by Mexicans, hogs are raised more for pork. Mexico, before the war, was one of the principal importers of United States lard. During the war, however, Argentina became the leading supplier, and by 1945 Argentine imports far exceeded those from the United States.

Brazil

Brazil is one of the few Latin American countries that have been self-sufficient lard producers during recent years. The hog population in Brazil, estimated at 25,000,000 head in 1942, is the largest in Latin America. Practically all the lard output is in southern Brazil, including the States of Rio Grande do Sul, São Paulo, Goiaz, Mato Grosso, and Minas Gerais. Brazilian production averaged approximately 71,500 short tons annually during 1925-29 but decreased during the succeeding years. In 1943, the output for the Provinces mentioned was estimated at only 37,000 tons. Although the Brazilians prefer lard to vegetable shortenings and cooking oils, considerable inroads have been made in domestic cottonseed-oil preparations. Exports of lard fell from 15,000 short tons in 1935 to 63 tons in 1942 owing to the loss of the European market, principally the United Kingdom and Germany. During the war small amounts moved to other Latin American countries.

Argentina

The production of lard in Argentina reached approximately 60,000 short tons in 1945, which is 6 times the average annual output of 1935-39. Hog numbers reached record levels in Argentina, around 9,000,000 head in 1944, owing to the British demand for pork and the favorable corn-hog ratio. The production of lard in Argentina is on an export basis, since domestic consumption is low relative to other fats and vegetable oils. Estimates indicate that only 10 percent of the Argentine lard production is consumed domestically. Lard exports rose from an annual average of 8,500 short tons during 1935-39 to 58,700 tons in 1945. Practically all these shipments went to other Latin American countries.

Other Western Hemisphere Countries

Apart from Argentina, Brazil, and Uruguay, lard production in most Latin American nations is insufficient to meet local demands. Cuban production, estimated at between 2,500 and 3,000 short tons annually, usually furnishes only 10 percent of the domestic demand for this commodity. The United States has always been the principal supplier. During the 5-year prewar period, Cuba was second only to the United Kingdom as a market for United States lard.

During the war, lard output increased in many South and Central American countries. In Colombia, production exceeded 20,000 short tons in 1943, and imports virtually disappeared. In several other countries, however, notably Peru and Ecuador, the bulk of the lard was imported, mainly from Argentina. In the Dominican Republic and in Central America, oils from domestically grown vegetables, peanuts, sesame, and copra were used as lard substitutes during the war.

Europe

Germany, prewar, was second to the United States in lard and unrendered pork-fat output; Europe was the largest continental producer. Hog and lard production in parts of Europe is not dependent on any one feed crop, such as corn. Grain and potatoes are commonly used in some countries and, in others, skimmed milk and protein feeds.

European output, adversely affected during World War I, recovered in the late 1920's in most producing countries. Consequently, protective duties, quotas, and restrictions were imposed by many countries on lard, which caused a large drup in imports. The decline was accentuated by the smaller United States output of lard during the drought years of the middle 1930's and the increased competition in Europe from other fats and oils.

United States exports, mainly dependent upon the European market, fell from an annual average of 375,800 short tons during 1925-29 to 82,800 tons during 1935-39. During World War II, hog numbers were severely reduced in the principal hog-raising areas of Europe. Consequently, lard and pork-fat production fell from an average of around 1.5 million tons for all Europe during 1935-39 to about half this amount in 1945.

The United Kingdom, the world's largest importer of lard, had a prewar domestic production of about 45,000 short tons, which supplied about one-fourth of its requirements. Although over 4,000,000 hogs were raised annually before the war, they were predominantly of the bacon type. Lard was comparatively unimportant. The United States was the principal lard supplier, furnishing 85 to 90 percent of United Kingdom imports. Lard imports dropped after 1934, reflecting a sharp decline in United States lard production and increasing competition from vegetable-oil compounds.

The German hog industry was the source of approximately 18 percent of Germany's prewar agricultural income, ranking second to the dairy industry. The annual output of lard and unrendered pork fat during the 1930's averaged around 350,000 short tons. The increased production was stimulated by strong Government measures protecting and stabilizing the hog and hog-products markets in Germany. Lard imports, amounting to 108,300 tons annually during 1925-29, came mostly from the United States. Purchases decreased almost continuously after 1928, and imports during 1935-38 averaged only 37,600 tons a year owing to shortages of lard in the United States and to restrictions placed on imports by the German Government. Denmark and Hungary were the leading suppliers.

Italian production of lard and unrendered pork fat almost completely supplied prewar domestic requirements. Only small amounts were imported. France, although more dependent on vegetable fats and oils, was a lard importer up to 1931. Under protective tariff measures effected in 1932, the pig population increased, and after 1935 France became an exporter of lard.

In Hungary hog numbers have a relation to corn production, similar to that in the United States. Next to bread, pork and hog fat are the most important items of diet among the lower income groups. Hungary had more than 4.6 million hogs in 1940, and lard and hog-fat production during 1935-39 averaged 110,000 tons. Output may have been reduced by as much as 85 percent during the war because of the loss of hog numbers.

Poland and Yugoslavia imported lard in considerable quantities through 1929. Thereafter imports decreased rapidly, hog numbers increased, and during the 1930's these countries became lard exporters. The lard and hog-fat output of Poland averaged 123,000 tons annually during 1935-39, and that of Yugoslavia, about 75,000 tons. Production was severely reduced in both countries during the war.

Sweden's domestic lard production of around 10,000 tons annually has usually satisfied consumption requirements. In Norway, lard production and imports have always been small, since whale- and vegetable-oil compounds are more widely used. In

Eire, about 2,000 tons of lard were produced annually before the war. About half the production was exported, principally to the United Kingdom. Output declined during the war because of the drop in feed supplies and hog production.

The Baltic States, Latvia, Lithuania, and Estonia, imported most of their lard requirements in the 1920's. With the development of pig stocks in the 1930's, Latvia and Lithuania became lard exporters.

Asia, Africa, and Oceania

Hog numbers and lard production data are not available for most countries of Asia, Africa, and Oceania. In several Asiatic and North African countries religious beliefs prevent widespread production and consumption of hog lard. Small amounts of lard are usually imported for consumption by the European-colony groups. Hog numbers in India approximated 2.7 million in 1940. Lard imports before the war were usually less than 500 short tons a year. China appears to be the only important exception. Hog numbers in China, including Manchuria and Mongolia, were estimated in 1941 at 62 million, the highest of any nation. Although no output statistics are available, hog-fat production is believed to be large. Exports of lard from China are negligible. In Japan, hog numbers were estimated at 1.3 million in 1941, and lard production for that year was about 1,100 short tons.

One of the largest lard producers in Africa is Madagascar. In 1939 an estimated 1,000 tons were rendered. During the war, however, production declined to around 400 tons in 1944 owing to increased prices of feedstuffs.

Australia and New Zealand are self-sufficient in regard to lard. Normally, there is no great demand for lard, because the population prefers other fats and vegetable oils. Small quantities are exported from both Dominions. Hog numbers in 1941, estimated at 1.8 million in Australia and at 769,000 in New Zealand, were virtually unchanged during the war years.

WORLD TRADE

The United States ranks first in respect to lard-export trade. During 1925-29, exports averaged 375,800 tons a year and supplied about 80 percent of the world total. (See table 47.) Europe, a large consumer of United States lard, decreased its purchases during thd 1930's. From 1934 to the outbreak of war, several European countries increased their lard exports and competed to some extent with the United States in world trade. Before the war, the United Kingdom, Germany, Cuba, and Mexico were the principal consumers of United States lard. In 1945 United States lard shipments went primarily to the United Kingdom, the Soviet Union, France, and Cuba. (See table 48.)

Argentina, although comparatively unimportant as a prewar lard exporter, ranked second in 1934, supplying the bulk of the requirements of many Latin American countries. Argentine exports reached 58,700 tons in 1945, having jumped from 2,400 tons in 1940. Although Bolivia was the largest purchaser of Argentine lard in 1941, Cuban imports surpassed those of Bolivia in 1943. In 1945 Mexico received almost half of Argentina's lard exports.

Canada and Brazil, the remaining sizable exporters of lard, decreased their shipments during the war. Brazil's exports dwindled owing to the lack of European markets, and Canadian shipments were affected by the wartime shortage of lard substitutes in the home market.

Table 47. - *Lard: Exports by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Western Hemisphere:								
United States	375.8	82.8	100.6	196.4	325.8	368.5	429.4	269.5
Peru	3.0	5.6	-	-	-	-	-	-
Canada	2.0	9.7	1.3	3.0	.8	.4	16.1	-
Argentina	.1	8.5	2.4	9.0	22.2	36.0	43.6	58.7
Brazil	.1	6.4	5.1	.4	.1	.1	-	.2
Estimated total . . .	385.0	120.0	120.0	215.0	360.0	410.0	495.0	530.0
Europe:								
Netherlands	32.3	8.5	-	-	-	-	-	-
Denmark	13.0	12.5	3.1	.5	.1	.4	1.3	-
Hungary	4.8	15.4	-	-	-	-	-	-
Eire	2.0	1.7	-	-	-	-	-	-
Belgium	1.0	.8	-	-	-	-	-	-
Yugoslavia	.5	7.7	-	-	-	-	-	-
Poland	(1)	3.5	-	-	-	-	-	-
France	.3	2.5	-	-	-	-	-	-
Sweden	.7	.9	.3	-	-	-	-	-
United Kingdom	.5	.3	.1	-	-	-	-	-
Germany	.4	(1)	-	-	-	-	-	-
Italy	.4	(1)	(1)	(1)	-	(1)	-	-
Austria	.3	(1)	-	-	-	-	-	-
Estimated total . . .	60.0	60.0	10.0	5.0	5.0	5.0	5.0	5.0
Asia, Africa and Oceania:								
China	5.3	[2]4.9	[2]7.5	-	-	-	-	-
Australia[3]	.7	1.9	7.1	7.8	3.9	2.6	1.4	-
Madagascar	1.0	1.0	.6	.7	.6	.6	.1	(1)
British Malaya	.5	.2	-	-	-	-	-	-
New Zealand	.1	.2	-	-	-	-	-	2.4
Estimated total . . .	10.0	10.0	20.0	15.0	10.0	10.0	10.0	10.0

[1] Less than 50 short tons.

[2] Not including Manchuria.

[3] Includes refined animal greases; July-June year.

Compiled from official and trade sources.

Table 48. - *Lard: Imports by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Europe:								
United Kingdom	133.6	84.3	38.9	108.2	244.7	244.6	211.9	101.5
Germany	108.3	[1]37.6	16.7	6.6	6.6	5.5	.1	–
Czechoslovakia	33.0	[1] 9.2	–	–	–	–	–	–
Austria	16.5	[1] .4	0	–	–	–	–	–
France	16.4	.1	.3	.2	(2)	–	–	–
Poland	15.1	0	–	–	–	–	–	–
Belgium	8.0	2.5	12.6	–	–	–	–	–
Netherlands	3.3	1.5	0	–	–	–	–	–
Finland	3.4	.1	–	–	–	–	–	–
Switzerland.	3.0	.5	.8	.6	.2	.4	2.1	3.4
Italy	3.7	.5	.2	.1	(2)	.2	–	–
Norway	.9	(2)	(2)	(2)	0	0	–	–
Denmark.	.7	0	0	0	0	0	0	–
Eire	.3	(2)	.5	.3	.7	.1	(2)	–
Yugoslavia	.7	(2)	–	–	–	–	–	–
Sweden	1.4	.3	–	–	–	–	–	–
Estimated total . .	350.0	140.0	80.0	120.0	260.0	255.0	215.0	108.0
Western Hemisphere:								
Cuba	43.6	19.3	33.0	32.8	31.2	39.8	33.1	30.7
Mexico	28.0	2.3	10.3	9.2	11.4	7.8	35.6	35.4
Colombia	13.5	1.7	5.0	.6	.1	(2)	–	–
Peru	5.8	.2	.5	1.0	3.8	2.8	12.9	–
Venezuela.	–	[3]5.9	4.7	3.0	2.1	2.0	–	–
Puerto Rico.	3.5	–	–	–	–	–	–	–
Bolivia	0	.5	1.5	–	1.8	5.0	2.5	–
Dominican Republic . .	2.4	.7	1.1	.6	0	0	.4	–
Haiti	[4]1.3	.4	.5	.3	.1	.2	–	–
Ecuador.	–	[5]1.3	1.4	1.5	3.1	2.5	5.1	7.1
Brazil	1.1	(2)	(2)	0	0	0	–	–
Canada	.7	(2)	(2)	(2)	–	–	–	–
Chile	–	–	.1	.1	.3	.3	–	–
Panama	–	–	–	1.0	1.0	1.5	–	–
Estimated total	115.0	38.0	63.0	58.0	63.0	73.0	98.0	100.0
Asia, Africa and Oceania:								
Philippine Islands . .	2.4	.1	–	–	–	–	–	–
Union of South Africa	–	.1	–	–	–	–	–	–
British Malaya	[1]1.9	.8	–	–	–	–	–	–
Australia	.2	(2)	.1	(2)	(2)	(2)	–	–
Estimated total . .	5.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

[1] 4-year average. [2] Less than 50 short tons. [3] 1939 only. [4] 2-year average.

[5] 3-year average.

Compiled from official and trade sources.

Table 49.-*Tallow: Estimated production by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

CONTINENT AND COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Western Hemisphere:								
United States[1]. . .	547.2	548.8	780.7	892.1	1,009.3	954.4	1,070.3	976.5
Argentina	–	[2]98.0	–	133.0	–	–	–	–
Brazil[3]	–	[4]45.0	43.0	–	38.0	29.3	–	–
Mexico	–	33.0	33.0	32.5	32.0	30.0	30.0	31.0
Uruguay	–	19.3	–	–	–	–	–	–
Canada[5]	–	–	17.1	22.5	21.0	–	–	–
Chile	–	12.0	8.0	–	6.0	6.0	–	–
Cuba	–	5.5	6.0	6.0	5.0	–	5.5	6.0
Estimated total .	–	800.0	–	–	–	–	–	1,200.0
Europe:[6]								
Germany	–	[2]80.0	88.0	77.0	79.0	68.0	–	–
France	–	[7]56.0	–	–	–	–	–	33.6
United Kingdom. . .	70.0	38.0	–	–	–	–	–	–
Italy	–	[7]33.6	–	–	–	–	–	16.5
Poland	–	[7]16.5	–	–	–	–	–	–
Denmark	–	[7]16.5	–	–	–	–	–	12.
Spain	–	[8]16.5	–	–	–	–	–	13.0
Czechoslovakia . .	–	[7]15.4	–	–	–	–	–	11.0
Netherlands	–	[7]13.2	–	–	-	–	–	5.5
Belgium	–	12.0	–	–	–	–	–	5.5
Sweden[9]	–	[7]8.8	–	–	–	–	–	8.8
Austria	–	[7]7.7	–	–	–	–	–	5.5
Switzerland[9]. . . .	–	5.0	6.0	6.0	5.0	3.8	3.0	3.0
Norway	–	[7]4.4	–	–	–	–	–	2.2
Estimated total .	–	350.0	–	–	–	–	–	220.0
Oceania, Asia & Soviet Union:								
Australia[6]	–	64.0	–	48.0	60.0	65.0	–	-
New Zealand	–	36.0	42.5	50.5	67.0	67.0	–	–
Japan	–	6.8	7.5	9.1	3.7	1.3	–	(10)
Soviet Union . . .	–	100.0	–	-	–	–	–	–
Estimated total .	–	300.0	–	-	–	–	–	–
Estimated world total	–	1,450.0	–	–	–	–	–	–

[1] Figures according to United States Department of Agriculture estimates, which include hog grease amounting to 30 or 35% of the total. [2] 2-year average. [3] Produced from cattle slaughtered under Federal inspection. [4] 4-year average. [5] Production of meat-packing and slaughter industry. [6] July-June year. [7] 1933-37 estimated average. [8] Average 1931-35. [9] Edible tallow only. [10] Less than 50 short tons.

Compiled from official and trade sources.

TALLOW[2]

SUMMARY

The United States is the leading producer and consumer of tallow. In 1945, production of tallow and greases in the United States totaled almost 1 million short tons, of which approximately one-third consisted of greases. The tallow output of the rest of the world during the same year amounted to around 600,000 tons, produced primarily by the Southern Hemisphere countries. The 1945 world production thus totaled 1.6 million tons, compared with the 1935-39 average output of around 1.4 million tons, of which the United States produced about 40 percent, Europe around 25 percent, and the Southern Hemisphere countries and the Soviet Union most of the remainder. (See table 49.) European production of tallow, although contributed to in some degree by every country, has never been large enough to supply Europe's requirements. During the war, the output fell sharply in most of these countries owing to the reduction in livestock numbers. The larger 1945 output in the United States and the Southern Hemisphere was, however, great enough to more than compensate for reduced European production.

The greater part of the United States production is consumed domestically, whereas that of Argentina, Australia, and New Zealand is exported, chiefly to the United Kingdom. Consumption of tallow in most Latin American countries increased during the war on account of their inability to obtain copra and other hard vegetable oils.

OUTLOOK

European tallow production, which decreased around 40 percent during the war, will gradually recover as cattle numbers are restored. Production of the United States, Argentina, Australia, and New Zealand, maintained at abnormally high levels during the war, may be expected to decline. Wider industrial uses of inedible tallow and its derivatives have occurred during the past decade.

TYPES AND USES

Tallow is obtained chiefly from rendered beef fat and in smaller quantities from sheep, goats, and horses. In the United States, edible tallow usually is produced from beef-cutting scrap fats and often scrap fat from oleo kettles. Oleo stock, the highest grade of edible tallow from which oleo oil and oleo stearine are made, is rendered from superior fats surrounding internal organs and tissue. Oleo oil, bright yellow in color, possesses a sweet, bland, butterlike flavor. It is used in margarines and baker's shortenings. Oleo stearine is used principally in lard substitutes and also by the confectionery industry. Although mutton tallow is harder and richer in stearine than beef tallow, it is not often used for edible preparations, because it is likely to turn rancid. The use of tallow in margarine during the past 15 years has shown a gradual decline in favor of vegetable oils.

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[2] This survey deals with edible and inedible tallow, oleo stock, and derived products, such as oleo stearine and oleo oil. A world survey of this nature presents certain difficulties owing to the lack of uniformity in processing and in statistical classification in different countries. In many cases, animal fats could not be separated statistically. In other cases, the question arose whether or not certain fatty animal substances should be classified as tallow. In the United States tallow and grease production are estimated as an aggregate, with grease derived mainly from hogs.

Inedible tallow, the largest tallow classification, is rendered from lower grade fats and finds its largest outlet in soap manufacturing. Smaller quantities are converted to stearic acid and oleic acid (red oil), which have numerous industrial uses.

PRODUCTION BY REGIONS

Western Hemisphere

United States

Tallow production, including greases, in the United States averaged 1.0 million short tons annually from 1942 to 1945, or almost twice the prewar 1935-39 average. The increase is attributed to larger cattle and hog numbers and to greater recovery of fat per animal slaughtered. More than 85 percent of the tallow output in recent years comprised inedible tallow and greases; the remainder consisted of edible tallow, oleostearine, oleo stock, and oleo oil. Since 1920, there has been an upward trend in the production of inedible tallow. Edible tallow and oleo stock have gradually declined, reflecting a lessening demand for animal fats in the manufacture of margarine and compounds. Total recovery of all types of tallow per 100 pounds live weight of cattle slaughtered in Federally inspected plants increased from less than 8 pounds in the early 1920's to about 10 pounds in the early 1940's. The bulk of the United States tallow production is consumed domestically.

Argentina

Argentina usually ranks second as a world tallow producer and is first in quantity exported. Production of all types of tallow and its byproducts was estimated at 115,000 short tons in 1939 and rose to 133,000 tons in 1941, the last year for which data are available. Production is believed to have fallen in 1945 owing to a decline in cattle slaughter caused by smaller marketings, strikes, and the effect of drought on pastures. Approximately one-third of the total output falls within the inedible classification.

Brazil

Brazil, an important tallow producer in the Western Hemisphere, has undergone a continual decline in production during the past several years. In 1937 nearly 50,000 short tons were produced from slaughter under Federal inspection. In addition, a small unknown quantity was produced from rural slaughter. In comparison, the 1943 output was less than 30,000 tons, although there was relatively little change in cattle numbers. During the past decade Brazil changed from an exporter to an importer of tallow.

Other Western Hemisphere Countries

In Mexico, during the past decade, estimated tallow production varied from 30,000 to 33,000 tons annually. Exports, which were small prior to 1941, ceased during the war, and imports increased. Uruguay is a comparatively large producer of tallow, considering its size. During 1935-39 an annual average of nearly 20,000 short tons was produced. Canada's tallow output increased from approximately 17,100 tons in 1940 to 21,000 tons in 1942. In Chile almost half the tallow production is obtained from mutton fats. The annual output during 1935-39 averaged around 12,000 tons and fell to roughly half this amount in 1943. The entire production is consumed domestically. Cuban tallow production, around 6,000 tons annually, is largely inedible and usually supplies only a small part of the domestic requirements.

Oceania

Australia and New Zealand together produce and export about the same amounts of tallow as Argentina. Australia's output averaged around 64,000 tons a year during 1935-39 and that of New Zealand nearly 36,000 tons. Tallow production increased in both Dominions during the war.

The fact that the tallow output almost doubled in New Zealand during the past decade is attributed to a great increase in boning out and dehydration of meat. Cattle numbers remained about the same in both countries during this period. The bulk of the New Zealand tallow is used in the domestic soap industries.

Europe

Total European production of tallow was estimated at around 350,000 tons annually during 1935-39. Of this amount Germany produced about one-fourth with France and the United Kingdom following in volume of production. Spain, Denmark, Poland, and Italy were other leading producers. Output declined in the majority of European countries during the war owing to the shortage of feedstuffs, especially imported oil cake and grains in western Europe. The diversion of feed crops to human consumption also caused a reduction in numbers and live weight of cattle.

European imports, principally from the United States, South America, Australia, and New Zealand, have always exceeded exports. The volume of imports declined during the 1930's in comparison with the 1920's owing to self-sufficiency programs and trade restrictions in several nations. Perhaps even more important was the decreased use of animal fats in the margarine industry. Although a transition from animal to vegetable fats took place in many countries, tallow continued to be used in soap making and for technical purposes.

Asia

Little information is available on tallow production in Asiatic countries. The cattle population of India is believed to be the largest in the world. In 1935 cattle numbers in the country were estimated at more than 162 million head. In addition, there were approximately 45.5 million buffaloes. Goat and sheep populations in 1930 were around 48 million and 42 million, respectively, in British India, not including the independent Provinces. Religious beliefs of the Hindus, who constitute the majority of the population of India, prohibit the slaughter of livestock. Cattle and buffaloes, when too old to serve as draft animals, are often retired to "old age" homes. Consequently, tallow output is extremely small in comparison with livestock numbers.

The prewar cattle population of China, including Manchuria, was estimated at around 25 million head, making China rank next after Argentina or sixth in world cattle numbers. There is no large-scale commercial tallow production, because output is primarily consumed locally. China exported small amounts of tallow to Japan during the war.

Cattle numbers in Japan, approximately 2 million head in 1940, are small in comparison with other Asiatic countries. Tallow output at that time totaled about 7,500 short tons. Production fell to less than 50 short tons in 1945.

Africa

The Union of South Africa is by far the leading producer, consumer, and importer of tallow in Africa. Although figures are not available regarding tallow production, livestock numbers during 1935-39 averaged over 11.6 million head a year and expanded to around 13 million in 1945. Other important cattle-raising regions in Africa, for which tallow production data are not available, include Madagascar, Tanganyika, Kenya, Southern Rhodesia, Egypt, and Morocco. Total cattle numbers in Africa were estimated at 62.4 million head in 1940 and increased to nearly 68 million by 1945.

Soviet Union

Cattle and sheep numbers in the Soviet Union on January 1, 1938, were reported at approximately 51 million and 57 million head, respectively. Based on meat production during that year, the belief is that tallow production approximated 100,000 short tons, which would place the Soviet Union slightly above Argentina and second only to the United States in world tallow production during 1935-39. Beef tallow constituted roughly 65 percent of the output.

WORLD TRADE

Only a small percentage of the world tallow production enters international trade. Argentina is by far the largest exporter, having supplied around 45 percent of world exports of about 140,000 tons in 1945. They went principally to the United Kingdom, followed by Mexico, the United States, Cuba, and Chile. New Zealand and Australia are the next ranking exporters, and the United Kingdom is the largest importer. (See table 50.)

United States tallow trade has been subject to extreme fluctuations during the past two decades. Exports amounted to only 6,600 short tons in 1945. Tallow imports often exceeded exports. Although Canada has normally been a small net exporter of tallow, imports have been larger than exports during the war. In most Latin American countries tallow imports have greatly increased since 1940. Chile, Cuba, Brazil, and Mexico are the leading purchasers. Although Brazil and Mexico exported tallow in prewar years, shipments virtually ceased during the past 5 years.

Before shipments were cut off in 1940, Europe was a large importer of tallow from South America, Australia, New Zealand, and the United States. The United Kingdom, Germany, and the Netherlands imported around 45 percent of the world average annual 1935-39 imports of approximately 215,000 tons. (See table 51.) European exports of tallow have always been small in comparison with imports. The United Kingdom, Belgium, France, and the Netherlands were the leading prewar exporters.

Asia and Africa are small net importers, led by Japan and the Union of South Africa, respectively. During the war imports almost stopped. The few shipments reaching Japan came mainly from China and Korea.

Table 50. - *Tallow: Exports by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Western Hemisphere:								
Argentina	99.0	66.2	57.4	86.4	124.5	82.9	107.0	62.9
United States . . .	89.4	10.9	5.5	5.6	11.3	18.3	15.7	6.6
Uruguay	18.1	9.3	4.1	5.7	2.8	4.8	5.6	–
Brazil	4.2	11.4	4.3	1.9	.4	(1)	–	(1)
Mexico	3.6	.2	(1)	(1)	0	0	0	–
Canada	1.1	3.1	.6	1.1	(1)	(1)	2.5	–
Estimated total .	220.0	102.0	75.0	105.0	143.0	110.0	134.0	73.0
Oceania, Asia & Africa:								
Australia[2].	45.4	34.6	45.4	32.1	39.1	6.1	36.0	–
New Zealand	26.2	30.5	38.2	44.0	58.3	50.3	29.8	[3]29.9
China	2.6	.2	.4	–	–	–	–	–
India	.6	.2	.4	.3	.2	.1	(1)	–
Japan	(1)	.1	–	–	–	–	–	–
Union of South Africa	(1)	(1)	.2	.2	.1	.1	-	-
Estimated total .	80.0	67.0	87.0	78.0	100.0	58.0	67.0	65.0
Europe:								
United Kingdom . .	30.0	36.4	10.3	3.2	1.0	.3	.2	1.3
France	10.7	[4]8.8	1.0	.3	.1	–	–	–
Denmark	10.3	3.1	2.3	(1)	.2	.3	.2	–
Belgium.	5.9	10.8	–	–	–	–	–	–
Netherlands. . . .	4.8	5.7	–	–	–	–	–	–
Austria.	2.6	[4].9	–	–	–	–	–	–
Germany	1.8	[4] (1)	(1)	.4	.1	(1)	–	–
Sweden	1.3	1.6	.9	–	(1)	–	.5	–
Norway	.7	1.5	.1	(1)	0	0	-	-
Switzerland . . .	.8	.8	(1)	0	0	0	0	-
Eire	.3	.6	0	0	0	0	0	0
Czechoslovakia . .	.2	(1)	–	–	–	–	–	–
Hungary.	.2	.1	–	–	–	–	–	–
Estimated total.	70.0	71.0	28.0	5.0	2.0	2.0	2.0	2.0
Estimated world total	370.0	240.0	190.0	190.0	245.0	170.0	203.0	140.0

[1] Less than 50 short tons.

[2] July-June year.

[3] January-October only.

[4] 4-year average.

Compiled from official and trade sources.

Table 51. -*Tallow: Imports by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

CONTINENT AND COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Europe:								
United Kingdom . . .	86.0	58.0	82.0	72.0	75.0	54.0	90.0	45.0
Netherlands	50.8	17.0	-	-	-	-	-	-
Germany	32.4	18.1	-	-	-	-	-	-
Italy	11.4	[1]6.2	-	-	-	-	-	-
France	10.4	2.0	8.4	2.6	.1	-	-	-
Belgium	9.2	5.7	-	-	-	-	-	1.8
Spain	8.0	[2]7.2	2.6	3.5	2.8	-	-	-
Denmark.	8.0	4.3	.2	(3)	(3)	(3)	(3)	-
Norway	6.7	.3	-	-	-	-	-	-
Sweden	5.9	5.1	-	-	10.5	4.2	2.0	-
Yugoslavia	3.9	.5	-	-	-	-	-	-
Switzerland.	3.5	2.5	3.4	3.4	5.5	2.4	2.0	-
Czechoslovakia . . .	2.6	.2	.1	.3	-	-	-	-
Finland	1.5	1.2	-	-	-	-	-	-
Eire	1.8	1.9	2.2	.4	2.2	.2	.2	(3)
Hungary	1.6	.2	.1	-	-	-	-	-
Poland	1.1	[1]3.7	-	-	-	-	-	-
Estimated total . .	260.0	145.0	137.0	110.0	110.0	95.0	100.0	60.0
Western Hemisphere:								
United States	6.9	36.8	.7	17.6	39.2	20.4	38.2	17.0
Mexico	6.4	4.6	1.2	1.4	4.2	4.7	6.9	10.0
Cuba	4.7	3.2	1.1	4.4	18.7	9.7	10.9	6.4
Chile	1.8	1.6	7.1	3.6	8.2	12.4	2.8	-
Dominican Republic . .	.6	.2	-	(3)	-	-	-	-
Brazil	.2	(3)	(3)	1.0	0	2.7	22.1	2.1
Canada	(3)	.4	.2	5.0	6.3	10.3	8.0	-
Estimated total . .	40.0	55.0	16.0	50.0	82.0	75.0	95.0	45.0
Asia, Africa, & Oceania:								
India	5.7	1.1	1.0	-	-	-	-	-
Union of South Africa	4.9	1.1	6.4	1.4	4.9	2.2	.2	-
Egypt	1.9	.6	.4	.2	.3	(3)	-	-
Japan	1.6	3.8	1.0	3.3	.4	.1	.2	.1
China	.8	.8	1.5	-	-	-	-	-
Australia [4]	.8	.7	.2	.6	1.2	(3)	(3)	-
New Zealand	.3	.7	(3)	(3)	(3)	(3)	-	-
Estimated total. . .	25.0	15.0	12.0	10.0	8.0	5.0	5.0	5.0
Estimated world total. .	325.0	215.0	165.0	170.0	200.0	175.0	200.0	140.0

[1] 4-year average. [2] 2-year average. [3] Less than 50 short tons. [4] July-June year.

Compiled from official and trade sources.

BUTTER

SUMMARY

Fat taken from milk and processed into either butter or pure fat (ghee, butter oil, etc.) is the most important and widely used fat in the world. The annual world production of butter, just prior to World War II, was estimated at 4.5 million short tons, equivalent to 3.7 million tons of fat. The output in 1945 is roughly estimated at 3.5 million tons of butter or approximately 2.8 million tons of fat. Indications point to a still lower output in 1946.

Fifteen percent of world butter production prior to 1939, or about 680,000 tons, entered international trade, most of which went to the United Kingdom. The decline in world production has now reduced exports to less than one-half the pre-1939 level.

Per capita consumption of butter varies widely by countries, ranging from as high as 38 pounds annually in New Zealand down to only about 11 or 12 pounds in such countries as France, Netherlands, and Czechoslovakia. Consumption is still lower in Asia and in tropical and semitropical countries.

OUTLOOK

Butter production is currently much below prewar years in most countries. The strong demand for fluid milk and cream in several countries has lowered the quantity of fat available for butter. In many European countries, smaller cow numbers and a reduced output of milk per cow have resulted in less butter being produced. Total butter output in 1945 in 15 of the major producing countries was about 16 percent less than the average for the 5 years 1934-38. Production in 1946 for these same countries is running still lower than in 1945. In the United States, the output during the first 3 months of 1946 was 71 percent of that of the corresponding period in 1945 and only 62 percent of the prewar period.

Supplies of butter entering world trade in 1946, estimated at about 300,000 short tons, will be less than half the average annual exports for the years 1934-38. As in the prewar period, the United Kingdom will absorb most of the supplies.

Little improvement in the butter output and supply situation is anticipated in the 2 or 3 years immediately ahead. No immediate improvement is visible in milk-cow numbers for the world as a whole. Concentrated feed supplies are limited, thus preventing, in some countries, a material increase in the output of milk per cow. The growth in population in many countries has exceeded the increase in milk-cow numbers, and this fact, together with a higher per capita rate of consumption of milk and cream, will continue to limit the quantity of fat available for butter. Improvement in the transporting and marketing of milk in other forms will also be an important factor limiting the quantity of butterfat moving to market for manufacture into butter.

PRODUCTION

Europe, North America, and Oceania produce a preponderance of the butter of the world. In prewar years, about 40 percent of the world output was produced in Europe, with production concentrated mainly in the western and northern part of that continent. Germany was the largest European producer, but the prewar output in that country averaged only about one-half that in the United States. (See table 52.)

The United States produces about one-fourth of the total world output of butter, and this, together with Canadian production, places the North American Continent second to Europe in butter production.

Australia and New Zealand produce about 10 percent of the world output of butter, but because of their small population these countries export a large part of the output.

The Soviet Union, Argentina, and Brazil are the only countries outside the abovementioned three continents that produce appreciable quantities of butter.

TRADE

Of the 680,000 short tons of butter entering world trade annually prior to 1939, about 78 percent was imported by the United Kingdom. Germany was the other principal importer, averaging about 85,000 tons for the 5 years 1934-38 (table 52). Prior to the war, butter production in the United States just about met demand at domestic prices. Imports were received in some years.

Supplies of butter for world trade come largely from New Zealand, Australia, Denmark, and the Netherlands. In the past, small quantities also entered world trade from the Baltic countries, Argentina, and Eire.

Table 52.-Butter: *Total world production and net trade, average 1934-38*

COUNTRY AND CONTINENT	1934-38		
	PRODUCTION	NET EXPORTS	NET IMPORTS
	Short tons	*Short tons*	*Short tons*
Western Hemisphere:			
United States	1,089,000	-	4,000
Canada	178,000	1,000	-
Brazil	[1]36,000	-	-
Argentina. . .	33,000	9,000	-
Chile.	[2]4,500	-	-
Cuba	[3]2,000	-	-
Peru.	1,000	-	-
Europe:			
Germany . . .	534,500	-	85,500
Denmark. . . .	200,500	164,000	-
France	199,500	2,500	-
Poland	152,000	9,500	-
Netherlands. .	108,000	54,500	-
Sweden	93,000	25,000	-
Czechoslovakia	81,500	-	(4)
Eire	74,500	26,000	-
Belgium . . .	71,000	-	5,000
Italy.	55,500	-	(4)
Switzerland. .	31,000	-	1,000
Finland. . . .	30,500	14,500	-
United Kingdom	28,000	-	532,500
Norway	27,500	(4)	-
Europe, Cont'd.			
Austria . .	24,500	3,000	-
Latvia. . .	22,500	20,500	-
Lithuania .	17,000	15,000	-
Estonia . .	15,500	13,000	-
Rumania . .	[5]14,000	-	-
Yugoslavia.	12,000	-	-
Hungary . .	11,000	4,500	-
Spain . . .	[6]8,000	3,000	-
Greece	[7]6,000	-	(4)
Portugal. .	[3]5,000	-	-
U.S.S.R. . .	[1]170,000	23,000	-
Asia:			
Japan . . .	29,500	-	-
Syria & Lebanon . . .	[3] 9,000	-	-
Africa:			
U.So. Africa	20,500	1,500	-
Egypt . . .	[1]16,500	-	1,000
Algeria . .	[8]2,500	-	2,000
Oceania:			
Australia .	218,500	109,000	-
New Zealand	186,000	154,500	-

[1] Less than a 5-year average. [2] 1936 only. [3] 1938 only. [4] Less than one short ton. [5] 1934 only. [6] 1933; represents butter produced from both cow's and goat's milk. [7] Includes butter produced from cow's, buffalo's ewe's, and goat's milk. [8] 1930.

WHALE OIL

SUMMARY

Whale-oil production for the 1945-46 season reached about 160,000 short tons which is around three times the average wartime output but only about 30 percent of the prewar average. With Germany and Japan removed from the industry, only Norway and Great Britain engaged in pelagic whaling in Antarctic waters during 1945-46. Because a number of the floating factories were lost during the war, only 9 participated in the last catch, compared with 35 that operated in 1938-39.

Whale oil, prior to the war, constituted around 8 percent of the total volume of international trade in fats and oils and made up about two-thirds of the world production of all marine oils. Almost all this commodity originated in the Antarctic Ocean.

OUTLOOK

The whaling industry is expected to recover fairly rapidly, and volume production may be achieved in the 1946-47 season. A limiting factor, however, will be the number of new and converted floating factories and catcher boats. A number of these vessels are now in process of construction, with more expected to be built.

The future output of whale oil, however, may never reach the prewar figure of 559,000 tons. To guard against depletion of the whales, a possibility conceded before the war, international agreements are now in force limiting the size of the 1945-46, and probably of the 1946-47, catch to a maximum of 16,000 blue-whale units. Should this limitation continue, future annual Antarctic whaling output would not exceed 280,000 or 300,000 tons.

The position of whale oil among the consuming nations is more difficult to predict. Consumption in Great Britain and Norway possibly may reach prewar levels. The future situation in Germany, formerly one of the largest consumers, remains obscure. Other countries, unless permitted to engage in whaling, will probably consume smaller quantities.

TYPES AND USES

Two types of oil, sperm and whale, result from rendering and processing whales. Each has characteristics and uses distinct from the other. Produced in smaller volume, sperm oil is mostly utilized in liquid waxes and is inedible. Its use in fine machinery is well-known. Because it does not gum, it is especially valuable in lubrication. Sperm oil is little affected by extremes of temperature and therefore is an excellent lubricant for motors operating under such conditions. It is also employed. on a minor scale, in cutting oils and as a softening agent in leather. Previously, it was widely employed as fuel for lamps, but petroleum fuels and electricity have replaced sperm oil in the lighting field.

In earlier years, whale oil was principally used as a fuel oil. But in the past two decades it has been put to a number of new uses through technical advances registered in refining and hydrogenation. With the objectionable fishy odor removed and the oil hardened, widespread utilization was made of this oil by European countries in compounds and margarine. In the United States, it was primarily employed as a soap fat. It is used to a certain extent in the leather, paint, lubricating, and printing-ink industries. A valuable characteristic is its keeping quality; even after 4 or 5 years' storage there is only slight deterioration.

Prewar utilization of whale oil was concentrated primarily in two countries, Great Britain and Germany, with Netherlands and Norway consuming smaller quantities. In all these countries, this commodity was mostly used for edible purposes. In the Western Hemisphere the United States has been the only significant consumer. In other countries, whale oil has been a negligible part of the fats and oils supply.

PRODUCTION

Whale-oil production in 1945-46 reached about 160,000 short tons compared with 70,000 tons in 1944-45 and the prewar average of 559,000 tons (table 53). Norway, the leading producer, accounted for about 90,000 tons. To compensate for the lack of floating factories, in 1945-46 the whaling season, normally from December 8 to March 7, was lengthened, the new period being from November 24 to March 24.

During the war, whaling activities were seriously curtailed. The German fleet was unable to continue expeditions because of the Allied blockade. A number of British and Norwegian vessels were sunk and others taken over for war use. Japanese ships did not participate in the Antarctic catch after 1940-41, and reports seem to indicate that all Japan's floating factories were lost or reconverted during the war.

Table 53.-*Whale Oil: World production, averages 1925-26 to 1929-30 and 1933-34 to 1937-38 annual 1925-26 to 1944-45*

PERIOD	NORWAY	UNITED KINGDOM	JAPAN	GERMANY	UNITED STATES	OTHERS	WORLD TOTAL
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1925-26	123,700	71,000	-	-	-	20,500	215,200
1926-27	128,600	72,600	-	-	-	21,300	222,500
1927-28	149,300	74,700	(1)	-	(1)	22,700	246,700
1928-29	226,000	95,100	1,300	-	6,700	22,400	352,100
1929-30	335,300	159,900	2,200	(1)	5,500	19,500	522,500
5 year average	192,600	94,800	211,800	-	[2]6,100	21,300	311,800
1933-34	234,000	222,300	4,300	2,200	4,600	15,000	482,400
1934-35	231,200	240,500	7,800	8,200	4,600	18,200	510,500
1935-36	217,000	231,300	13,900	29,200	15,200	58,500	565,100
1936-37	222,400	240,100	35,300	72,600	28,100	61,800	660,300
1937-38	218,100	243,700	78,800	90,200	31,000	37,800	699,600
5-year average	224,500	235,600	28,000	40,500	16,700	38,300	583,600
1938-39	159,400	-	111,300	101,000	-	-	[3]539,000
1939-40	176,900	-	128,600	116,600	-	-	[3]476,600
1940-41	38,400	-	5,200	-	-	-	[3]184,500
1941-42	33,600	-	2,600	-	-	-	[3]38,900
1942-43	26,500	-	2,500	-	-	-	[3]35,900
1943-44	29,900	-	4,700	-	-	-	[3]54,700
1944-45	27,200	-	1,100	-	-	-	[3]70,000

[1] Data not available. [2] 2-year average. [3] Preliminary and subject to revision; figures do not cross-add after 1937-38.

Compiled from official sources and International Whaling Statistics.

Table 54.- *Whale Oil: Imports into specified countries, averages 1925-1929 and 1935-1939, annual 1940-44*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
United Kingdom	61,000	212,700	279,600	106,200	98,100	57,800	47,000
Germany	[1] 88,000	[2] 204,300	–	–	–	–	–
Netherlands	[1] 58,400	76,900	–	–	–	–	–
Norway	15,800	33,400	–	–	–	–	–
France	2,500	[2] 1,500	–	–	–	–	–
Denmark	[1] 11,800	40,800	300	3,500	–	–	–
United States	23,900	14,800	11,100	3,700	8,000	59,200	25,400

[1] Figures include whale oil, refined and unrefined, and small quantities of other marine oils.

[2] 4-year average; figures for 1939 are not available.

Compiled from official sources.

About 90 percent of the world production of whale oil results from whaling operations in the Antarctic Ocean. Modern operation, with large floating factories, has been developed in the past two decades. These ships, some as large as 30,000 tons, are designed to operate for an entire season without putting into port. The remaining portion of the whale oil is produced from whales brought by catcher boats to land stations for processing.

Before the war, the leading producing countries were, in order of importance, Norway, Great Britain, Japan, and Germany. In comparison with the others, Japan and Germany did not engage in pelagic whaling until fairly recent years. Japan first began to send a few ships into the Antarctic during 1935-36. German participation in the industry began in the latter part of 1936. The United States, one of the leaders of the industry in the nineteenth century, was only a small producer at the outbreak of war. Of the two United States factory ships, one was sold in 1939 and the other dismantled in 1941. High costs of operation and various regulations caused operators from this country to withdraw from pelagic whaling.

In South America, Argentina and Chile are the only countries which have an interest in the industry. Argentina has one company managed by Norwegians. Whaling began in Chile about 1934. Several small Chilean companies are participating in the industry, but expansion has not been great. South Africa is expected to begin operations again next season with a new 30,000-ton factory ship.

TRADE

In 1938, around 80 percent of the world's whale oil production was imported by Germany and Great Britain. France, Denmark, Netherlands, and Norway accounted for most of the remainder. In prewar years the United States imported only about 5 percent of the total world output. Prior to the Revenue Act of 1934, the United States imported larger quantities, but the new excise taxes of that year were a factor in reducing subsequent imports. (See table 54.)

FISH-OILS

SUMMARY

The 1945 world production of fish oils, not including whale, seal, and shark-liver oils, is roughly estimated at 160,000 short tons, which is about half the 1935-39 annual average. The United States produced more than 50 percent of the world output in 1945. By comparison, during the prewar period about 35 percent of the world total was produced in the United States, around 27 percent was contributed by Japan, and the bulk of the remainder was processed in Norway, Iceland, the United Kingdom, and Germany. (See table 55.)

Table 55.- *Fish Oil (excluding whale and shark-liver oils): Production by specified countries, averages 1925-29 and 1935-39, annual 1940-45*

COUNTRY	AVERAGE 1925-29	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
United States	42.0	110.0	78.7	102.6	70.6	80.8	100.7	86.1
Japan	25.8	[1] 85.0	36.7	25.0	7.9	7.0	1.2	.7
Norway	-	[2] 30.0	[2] 20.0	[2] 10.0	[2] 5.0	-	-	5.0
Iceland	-	25.0	31.0	34.0	32.0	35.0	33.0	25.0
United Kingdom	-	[2] 20.0	-	-	-	-	-	-
Canada[3]	-	[1] 16.4	15.2	11.0	-	-	[4] 9.0	[4] 10.5
Germany	-	[2] 15.0	-	-	-	-	-	-
Newfoundland	-	-	-	-	-	[5] 4.4	[5] 4.1	-
Italy	-	[2] 5.0	-	-	-	-	-	-
Portuguese Angola	-	1.1	-	-	-	-	-	3.0
Portugal	-	[6] 1.0	-	1.3	1.0	1.3	1.3	-
Argentina	-	[6] .2	-	-	1.4	-	-	-
Spain	-	-	-	-	.1	-	-	-
Estimated world total . .	-	315.0	225.0	210.0	155.0	165.0	170.0	160.0

[1] 4-year average.

[2] Estimate.

[3] British Columbia only.

[4] Pilchard oil only.

[5] Year ending Oct. 31.

[6] 1 year only.

Compiled from official and unofficial sources.

OUTLOOK

Owing to the critical food situation in many countries, preference will undoubtedly be given to direct human consumption rather than to the processing of fish into oil. In addition, several of the European countries and Japan lack adequate fishing craft and supplies. Until equipment is restored, the prewar output of fish is not likely to be reached.

During the war, considerable interest arose over the virtually untapped fishing resources off the coasts of South America. Reports indicate these waters abound in fish, important as a source of food and oil. Already several firms have started shark-liver and fish-oil projects, notably in Argentina, Brazil, Chile, and Peru.

Two other potential resources of fish oil in the Western Hemisphere are the anchovies along the California coast and the waste from the Alaskan salmon pack. The total waste of the salmon pack amounts to 75,000 or 100,000 tons a year, of which only a small portion is processed into oil.

TYPES AND USES

The fish oil most universally produced, exclusive of marine-animal and shark-liver oil, is derived from pilchards (sardines). In the United States during the 1920's, menhaden was the largest source of fish oil but lost its prominence owing to the phenomenal growth of the Pacific-coast pilchard-and herring-oil industries.

Fish oils have a wide range of uses and possess a certain degree of interchangeability with animal and vegetable fats and oils. In the United States approximately 75 percent of the pilchard and herring oil goes into the manufacturing of soap. The second major use for fish oils is in the manufacture of insecticidal sprays, menhaden oil being the principal constituent. The tempering of steel and the manufacturing of linoleum and certain types of paint are other important industrial uses. Cod-liver oil enters largely into medicinal and pharmaceutical products, and inferior grades find a substantial outlet in the leather-processing industry. In Europe, fish oils are used to some extent for edible purposes.

PRODUCTION BY REGIONS

Western Hemisphere

United States

The United States is the largest producer of fish oil in the world and is a leading exporter and importer of this product. The 1945 output of fish oil, excluding marine-animal and fish-liver oils, was estimated at 86,100 short tons. About 50 percent of the production was pilchard (sardine) oil, menhaden oil comprised around 33 percent, and herring, tuna, and mackerel made up the remainder (table 56).

Table 56.- *Production of fish oil in the United States by kinds, average 1935-39, annual 1940-45*

PRODUCT	AVERAGE 1935-39	1940	1941	1942	1943	1944	1945
	1,000 sh. tons	*1,000 sh. tons*	*1,000 sh. tons*	*1,000 sh. tons*	*1,000 sh. tons*	*1,000 sh. tons*	*1,000 sh. tons*
Pilchard	75.7	47.2	67.8	47.0	52.2	67.8	44.1
Menhaden	16.8	21.6	22.6	19.2	21.5	22.7	28.5
Herring:							
Alaska	16.5	7.8	10.8	3.1	6.0	8.6	10.6
Maine	.9	.5	.5	.5	.3	.4	.3
Tuna & mackerel ...	1.1	1.6	.9	.8	.8	1.2	1.0
Total	111.0	78.7	102.6	70.6	80.8	100.7	[1]86.1

[1] Approximately 750 tons of groundfish oil and 850 tons of miscellaneous oils included.

United States consumption of cod-liver and cod oil rose from around 7,500 tons in 1921 to nearly 34,000 in 1937. It fell sharply during the war, however, as a result of reduced imports. United States production of these oils is small compared with that of Norway, Iceland, and Newfoundland, which normally export a large part of their cod-liver-oil production to the United States.

Newfoundland

The Grand Bank off the coast of Newfoundland is the most important source of cod. Virtually the entire production of fish oil in Newfoundland is exported, since domestic consumption is insignificant. Common cod oil usually makes up more than 50 percent of the fish-oil exports, cod-liver oil about one-third, and herring and miscellaneous oils the remainder. The United States and Canada are leading purchasers of Newfoundland fish oils.

Canada

Approximately half of Canada's output of fishery products comes from British Columbia, where herring and pilchards (sardines) are the mainstay of the fish-oil industries. In addition, considerable quantities of oil are derived from salmon waste, grayfish, and anchovies. In 1940, approximately 50 percent of the total oil output, amounting to about 15,200 tons, was from herring. Pilchard-oil production was about 25 percent, and salmon oil, 5 percent. On the Atlantic side of the Dominion, cod is the leading catch, and its output ranks second among all fish caught in Canada.

Other Western Hemisphere Countries

Argentina is regarded as the largest fish-oil producer in South America, although its output, when compared with that of the major producing nations, appears insignificant. A river fish, known locally as sabalo, is the principal source of fish oil other than shark-liver oil in Argentina. Other important varieties used for oil are hake, conger, anchovy, and weakfish. The 1942 production of fish oil was estimated at 1,400 short tons, which was more than 5 times the 1939 output. Exports of fish oil are comparatively small.

In Brazil the only fish-oil industry of importance is the production of shark-liver oil used for medicinal purposes. The small amount of fish oil consumed domestically, primarily cod-liver oil, is imported chiefly from Canada and the United States.

The countries along the west coast of South America - Chile, Peru, Ecuador, and Colombia - do not have important fishing industries. Although definite information is not available, their output of fish oil is considered insignificant. However, with the recent establishment of several new fisheries, fish-oil production may soon become more important. In many Caribbean islands commercial fishing is a comparatively undeveloped industry. Most islands do not have a catch large enough to supply their needs. Little, if any, fish oil is produced.

Europe

Norway

Norway, a leading fishing nation of the world, had a prewar 1934-38 average annual catch of over one million short tons of fish, of which around 70 percent were herring and brisling and about 20 percent were cod. About 45 percent of the total catch during this period went into the production of oil and meal. The annual fish-oil production, principally from cod liver, and herring, probably averaged around 30,000 tons in 1934-38, in comparison with around 15,000 tons in 1945. Norway is normally a leading exporter of fish oil, although during the war years shipments were reduced to insignificant amounts, which went to Germany. Small amounts of herring and sardine oil, primarily from Iceland and Japan, were imported before the war.

Iceland

The banks off the coast of Iceland are one of the richest fishing regions of the world. The waters south and southwest of the island furnish cod, and herring comes principally from north of the island. In addition, other important varieties of fish caught in these general areas are haddock, pollack, halibut, and flounders. Prior to the war, it was estimated that the waters around Iceland produced from 17 to 21 percent of the total European output of fish. Britain, Germany, Scotland, and Norway were the most important foreign competitors prior to the war, although at least 11 foreign nations fished in these waters.

The majority of fish caught are processed or canned for sale abroad; only comparatively small amounts go into the fish-oil industry. Herring and cod are the principal source of oil. During the war, herring-oil output was increased, whereas barreled-herring production fell off because of the higher profits gained from the sale of oil to the United Kingdom. The production of cod-liver oil was maintained at steady levels during the war. The principal purchasers of cod-liver oil in 1945 were the United States, the United Kingdom, Sweden, and France. The output of cod-liver oil during 1945 is estimated at 10,000 tons, and of herring oil, 15,000 tons. During the 1946 season production of both oils may reach 40,000 tons.

United Kingdom

Prior to the war, the United Kingdom was the leading producer of cod-liver oil, having an annual production of around 18,000 short tons, or about half the world production. Germany, Norway, Iceland, and Newfoundland were the other important world producers of this oil. At the outbreak of war, a large part of the British fishing fleet was requisitioned by the Government, which resulted in a drastic drop in the cod-fish supply and cod-liver-oil production. Exports of cod-liver oil practically ceased during the war.

The United Kingdom has always been a leading importer of fish oils. During the war, purchases, principally from Iceland, United States, Canada, and Newfoundland, were maintained at relatively high levels. Prewar imports were derived primarily from Japan and Norway and to a lesser extent from Newfoundland and the United States.

Germany

Prior to 1940, Germany, a leading producer of cod-liver oil, was surpassed only by the United Kingdom. Of the estimated annual world production in prewar years of around 40,000 short tons of cod-liver oil, Germany is credited with around 10,000 tons. Although herring from the North Sea comprised the greater part of the German fish catch, the oil output, mainly from herring scraps and wastes, was not large enough to fulfill German requirements. Prewar imports of fish oils normally exceeded domestic production.

Other European Countries

In Spain and Portugal fishing is one of the most important industries. Fish-oil production is small, however, and almost the entire output is consumed domestically.

Sardines comprise the largest and most important catch. Both exports and imports of fish oil have been negligible.

In the Netherlands and Belgium the principal catch is herring. Oil production has always been small. Before the war, both countries depended on outside sources for the bulk of their oil requirements. Nearly all the imported fish oil was edible, and only small amounts were for industrial purposes. The usual practice was to re-export part of the imported oil to other European countries.

In Sweden and Denmark cod and herring have always been the principal catches, and they increased during the war. The fish-oil industry in both countries, however, remained relatively unimportant. Denmark was one of the leading prewar importers of fish oil in Europe.

The Italian fishing industry expanded rapidly before the war, although high levels of fish-oil production were never reached. During 1935-39 an annual average of around 5,000 tons of sardine oil were produced.

The French output of fish includes mainly cod and herring and some sardines and mackerel. Although information is not available regarding production, most prewar fish-oil requirements were derived from imports, mainly cod-liver oil from Norway.

Asia

Japan

During prewar years, Japan occupied first place among the fishing countries of the world. The annual fishery output in 1936 was around 4 million short tons. Sardines accounted for around 75 percent of the total catch, and herring ranked second in quantity. Other fish were cod, mackerel, salmon, tuna, and bonito. Of all these, tuna and bonito were regarded as the most valuable.

Japan ranked second only to the United States in fish-oil production. Of the total output, which averaged about 85,000 tons in 1935-39, sardines supplied about 80 percent. Almost all the hardened oil used in Japan came from sardines. With the outbreak of war, shortage of labor, lack of fuel, and restrictions in fishing caused fish-oil production to dwindle to approximately 700 tons in 1945.

Japan has always been a leading importer as well as an exporter of fish oils. Prewar exports, almost exclusively of sardine oil, want mainly to Europe, with Germany taking the largest part.

Other Asiatic Countries

Apart from Japan, only comparatively insignificant quantities of fish oil are produced in Asiatic countries. Korea is the only other significant exporter of fish oil, mainly sardine oil, which was normally shipped to Japan.

Africa

Portuguese Angola is the most important producer of fish oil in Africa. The annual production during 1937-39 averaged about 1,100 short tons, and exports amounted to around 900 tons. During the war, the fish-oil output increased.

In the Union of South Africa fish-oil production, excluding whale oil, is mainly confined to vitamin liver oils. Before the war, the Union of South Africa was the leading importer of fish oil in Africa, although, on an average, only 300 tons were brought in each year.

Oceania

Little attempt has been made to establish a fish-oil industry in Australia, mainly because the Commonwealth is an extensive producer of animal fats and oils. In addition, Australia is near the tropical Pacific Islands, where vegetable oils were readily available before the war.

Fishing in the South Seas has been important mainly as a source of food to the inhabitants of that region. Bonito and tuna appear to be the most important catch. Little, if any, fish oil is believed to be produced in these islands.

Soviet Union

Although little information is available regarding the Soviet fishing industry, official figures show that fish production increased steadily from 1929 through 1936, reaching nearly 2 million tons in the latter year. The Caspian Sea and the Far Eastern waters off Siberia supply most of the Soviet fish output. Production and trade figures for fish oil are not available.

WORLD TRADE

Approximately half the prewar 1935-39 production of fish oils, estimated at 315,000 tons, entered world trade. Such leading producing nations as Norway, Iceland, and Newfoundland exported a large portion of their output (table 57). The principal

Table 57.- *Fish Oils (excluding whale and shark-liver oils): Exports by specified countries, average 1937-39, annual 1940-45*

COUNTRY	AVERAGE 1937-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Norway	40.4	17.6	8.0	4.1	2.8	(1)	(1)
Iceland	28.0	28.0	33.2	32.0	35.4	32.0	24.5
Japan	25.0	4.0	2.0	.4	-	-	-
Canada	[2] 13.8	[2] 7.3	-	-	-	-	20.0
United Kingdom	10.0	2.5	.7	.1	.3	-	-
Newfoundland	3.7	4.0	4.2	3.2	2.6	[3] 4.8	[3] 3.9
United States[4]	1.1	2.1	1.3	4.1	7.1	5.4	10.3
Portuguese Angola	.9	-	-	-	-	-	-
Belgium	.5	-	-	-	-	-	-
Argentina	.3	.3	(1)	.2	.3	-	-
France	.2	-	-	-	-	-	-

[1] Less than 50 short tons.

[2] Excluding liver oils.

[3] Year ended October 31.

[4] Including fish-liver-oil concentrates, averaging about 25 percent of the total.

Compiled from official and trade sources.

consuming nations were the United Kingdom, Germany, Japan, and the United States, although fish oils were imported to some extent by practically every nation of the world (table 58). During the war, international trade in fish oils was severely reduced when European and Asiatic supplies were completely cut off from the Western Hemisphere. The main trade channels during this period were between the United States and Canada, the United States and Latin America, Norway and Germany, and Iceland and the United Kingdom.

Table 58.- *Fish Oils (excluding whale and shark-liver oils): Imports by specified countries, average 1937-39, annual 1940-45*

COUNTRY	AVERAGE 1937-39	1940	1941	1942	1943	1944	1945
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Japan	44.0	43.0	30.0	13.8	.2	(1)	(1)
Germany	45.0	-	-	-	-	-	-
United States	32.9	9.8	12.7	8.3	16.1	14.7	15.4
United Kingdom	28.8	53.0	49.6	44.2	34.0	[2] 36.7	[2] 17.8
Norway	16.5	3.9	(1)	(1)	(1)	(1)	(1)
Denmark	11.6	1.0	-	-	-	-	-
Belgium	8.0	-	-	-	-	-	-
Netherlands	7.0	5.0	-	-	-	-	-
France	4.1	2.0	-	-	-	-	-
Italy	2.0	-	-	-	-	-	-
Canada	1.7	1.6	-	-	-	-	-
Greece	1.7	-	-	-	-	-	-
Yugoslavia	1.0	-	-	-	-	-	-
India	1.0	.7	.4	.3	.1	-	-
Australia & New Zealand	.6	.6	.3	.1	.1	-	-
Spain	.5	-	-	-	-	-	-

[1] Less than 50 short tons.

[2] Excluding liver oils.

Compiled from official and trade sources.

APPENDIX

A. Classification of Fats and Oils

Thus far no universally satisfactory classification of fats and oils has been worked out. Because of the varying characteristics and diversified sources of these products, they may be grouped or classified in numerous ways. Perhaps the most common is a classification system based on iodine numbers; that is, nondrying, semidrying, and drying oils.[1] Another method that has been employed is simply to group the fats or oils on an edible or inedible basis. Fats also may be classified as to their origin - animal, marine, or vegetable. Recently Bailey has classified fats and oils from the standpoint of their industrial utilization.[2]

For the purposes of this study, the classification given below combines some of the above-mentioned methods and may aid the reader in grouping the large number of commodities.

Suggested Classification of Fats and Oils

	Comments
Edible Vegetable Oils Cottonseed Olive Peanut Sesame Seed Soybean Sunflower Seed	Edible oils are consumed largely as shortening, margarine, salad and cooking oils. Foots obtained from refining these oils are used for soap making and other products.
Palm Oils Coconut Palm Kernel Palm Babassu Kernel	Commonly considered in the United States as soap fats but also widely used for edible purposes and industrial uses.
Industrial Oils Linseed Castor Rapeseed Oiticica Tung Perilla	The larger part of the industrial oils are used by industries refining drying oils. These oils also have varied industrial uses, such as for lubricants and treating leather. Castor and rapeseed are used as lubricants and for other purposes. In Europe and Asia rapeseed oil is used for edible purposes, whereas in the United States it is considered as an industrial oil.
Animal Fats Butter Lard Tallow	Animal fats constitute a large quantity of the edible fats and oils in the Western Hemisphere and Europe. Hog grease and inedible tallow are widely used for soap making.
Marine Oils Whale Fish	In European countries, whale oil is commonly used in the manufacture of margarine, but in the United States it is chiefly used in the manufacture of soap. Fish oils are largely used in the manufacture of soap and for industrial and pharmaceutical purposes.

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[1] JAMIESON, GEORGE S. VEGETABLE FATS AND OILS... Ed. 2, 508 pp., illus. New York. 1943.

[2] BAILEY, ALTON E. INDUSTRIAL OIL AND FAT PRODUCTS. 735 pp., illus. New York. 1945.

B. Oilseed Conversion Factors for Principal Oil-Bearing Materials

The oil-extraction rate for oilseeds varies country by country and within a country, depending upon the method of extraction and the quality of equipment utilized. Furthermore, the oil content of a particular oilseed varies according to the variety and the country in which it is grown. The following table indicates the oil content and oil yield obtained from commercial crushing.

Oil content and oil yield obtained from commercial crushings of specified commodities

COMMODITY	RANGE OF OIL CONTENT	OIL YIELD (CRUDE)	
		WORLD RATE	UNITED STATES RATE
	Percent	*Percent*	*Percent*
Babassu (kernels)	65–67	63	63
Cacao (beans)	50–57	50	–
Castor-beans	35–55	42–45	45
Copra	60–67	63	63
Corn(germ)[1]	40–48	38	38
Cottonseed	14–25	15	15.5
Hempseed	32–35	24	24
Kapok (kernels)	40	17	18
Flaxseed	32–43	32–34	34
Murumuru (kernels) . . .	36–42	33	36
Mustard Seed			
White	24–27	20	–
Black	27–33	25	–
Oiticica (kernels) . . .	55–62	40–52	–
Ouricuri (kernels) . . .	60–69	58	–
Olives	14–40	15	15
Oil-Palm pulp	30–70	–	–
Palm (kernels)	44–53	45	45
Peanuts (shelled)	38–50	36–44	40
Peanuts (unshelled) . . .	26–34	25–30	29
Perilla seed	38–40	37	37
Poppy seed	44–50	41	41
Rapeseed	30–45	35	35
Sesame seed	50–57	45	47
Soybeans	14–19	14–17	15
Sunflower seed	22–36	25	25
Tucum (kernels)	48–52	42	43
Tung nuts	16–21	16	16

[1] Wet process.

C. *United States tariff rates and excise taxes, applicable as of June 17, 1946: Vegetable oils and oilseeds and animal and marine fats and oils*

Item	Import Duty		Excise tax (To be added to duty)	
	Tariff paragraph	Rate[1]	On Imports[1]	On the first domestic processing
Vegetable Oils and Fats				
Almond oil, sweet	1752	Free	0	0
Babassu-nut oil	1732	Free	0	0
Cacao butter	777 (c)	12.5%	0	0
Cashew-nut-kernel oil	1732	Free	0	0
Cashew-nut-shell oil	53	20%	0	0
Castor oil	53	3¢ lb.	0	0
Coconut oil:				
1. Produced in the Philippines .	54	[2] Free	0	3¢ lb.
2. Produced in possessions . . .	54	(3)	0	3¢ lb.
3. Produced in the U. S. from Copra:				
(a) Produced in the Philippines or in U. S. possessions	54	(3)	0	3¢ lb.
(b) Produced in other countries	54	(3)	0	[4] 3¢ lb.
4. Produced in foreign countries	54	2¢ lb.	0	[4] 3¢ lb.
Corn oil	53	20%	0	0
Cottonseed oil	54	3¢ lb.	0	0
Croton oil	1732	Free	0	0
Hempseed oil	53	1.5¢ lb.	[5] 4.5¢ lb.	0
Kapok oil	53	20%	[5] 4.5¢ lb.	0
Linseed oil and combinations in chief value of.	53	4.5¢ lb.	(6)	0
Mustard oil	5	25%	0	0
Oiticica oil	1732	Free	0	0
Ouricuri oil	1732	Free	0	0
Olive oil:				
Weighing with container under 40 lbs.	53	[7] 8¢ lb.	0	0
Foots and rendered unfit for food	1732	Free	0	0
Other	53	6.5¢ lb.	0	0
Palm-kernel oil:				
Rendered unfit for food	1732	Free	0	3¢ lb.
Other	54	.5¢ lb.	0	3¢ lb.
Palm oil:				
For use in manufacture of steel products or tin or terne plate .	1732	Free	0	0
Other	1732	Free	0	3¢ lb.
Peanut oil	54	4¢ lb.	0	0

Tariff rates and excise taxes, applicable as of June 17, 1946: Vegetable oils and oilseeds and animal and marine fats and oils

Item	Duty		Excise tax (To be added to duty)	
	Tariff paragraph	Rate[1]	On[1] Imports	On the first domestic processing
Perilla oil	1732	Free	[5] 4.5¢ lb.	0
Poppy-seed oil	53	2¢ lb.	0	0
Rapeseed oil rendered unfit for food:	1732	Free	[5] [8] 4.5¢ lb.	0
Other (not denatured)	53	6¢ gal.	[5] 4.5¢ lb.	0
Sesame-seed oil:				
Rendered unfit for food	1732	Free	[5] 4.5¢ lb.	0
Other.	54	3¢ lb.	0	0
Soybean oil	54	[1] 3.5¢ lb. but not less than 45% ad val.	0	0
Sunflower-seed oil:				
Rendered unfit for food	1732	Free	[5] 2.25¢ lb.	0
Other	53	10%	[5] 2.25¢ lb.	0
Tea-seed oil	1732	Free	0	0
Tung oil	1732	Free	0	0
Vegetable tallow	1794	Free	0	0
Nut oils, n.s.p.f.	1732	Free	0	0
All other expressed or extracted vegetable oils	53	[1] 20%	0	0
Fish Oils				
Cod oil	1730	Free	0	0
Bulachon oil	1730	Free	3¢ lb.	0
Herring oil	52	2.5¢ gal.	1.5¢ lb.	0
Menhaden oil	52	5¢ gal.	3¢ lb.	0
Other fish oils, n.s.p.f.	52	20%	3¢ lb.	0
Marine-Animal Oils				
Seal oil	52	6¢ gal.	3¢ lb.	0
Sod oil	52	3¢ gal.	0	0
Shark oil	52	10%	1.5¢ lb.	0
Dogfish oil	52	10%	1.5¢ lb.	0
Sperm oil, crude	52	2.5¢ gal.	0	0
Sperm oil, refined	52	7¢ gal.	0	0
Whale oil (except sperm)	52	6¢ gal.	[5] 3¢ lb.	0
Other marine-animal oils, fats, & greases	52	20%	[5] 3¢ lb.	0
Animal oils				
Neat's-foot oil and stock	52	10%	1.5¢ lb.	0
Butter	709	14¢ lb.	0	0
Lard	703	3¢ lb.	0	0
Stearic acid:				
Valued not over 8¢ lb.	1	25%	3¢ lb.	0
Over 8¢ lb.	1	15%	3¢ lb.	0
Marrow, crude	1715	Free	0	0
Oleo oil	701	.5¢ lb.	1.5¢ lb.	0

Tariff rates and excise taxes, applicable as of June 17, 1946: Vegetable oils and oilseeds and animal and marine fats and oils

Item	Duty		Excise tax (To be added to duty)	
	Tariff paragraph	Rate[1]	On[1] Imports	On the first domestic processing
Oleostearine	701	.5¢ lb.	1.5¢ lb.	0
Oleo stock	701	.25¢ lb.	1.5¢ lb.	0
Tallow, edible	701	.25¢ lb.	1.5¢ lb.	0
Tallow, inedible	701	.25¢ lb.	[5] 1.5¢ lb.	0
Fish tallow (T.D.25,265)	52	20%	3¢ lb.	0
Wool grease containing:				
Over 2% free fatty acids	52	.5¢ lb.	3¢ lb.	0
2% or less of free fatty acids etc.	52	1¢ lb.	3¢ lb.	0
Suitable for medicinal use . . .	52	2¢ lb.	3¢ lb.	0
Other inedible animal oils, fats, and greases	52	20%	[5] 3¢ lb.	0
Other edible oils, fats, and greases	52	20%	0	0
Vegetable oilseeds				
Apricot and peach kernels	762	3¢ lb.	0	0
Babassu nuts and kernels	1727	Free	0	0
Castor-beans	762	.25¢ lb.	0	0
Copra	1727	Free	0	0
Cottonseed	762	.33¢ lb.	0	0
Flaxseed	762	[9] 32.5¢ per bu. 56 lbs.	0	0
Hempseed	1727	Free	1.24¢ lb.	0
Kapok seed	1727	Free	2¢ lb.	0
Ouricuri nuts and kernels	1727	Free	0	0
Palm-nut kernels	1727	Free	0	0
Palm nuts	1727	Free	0	0
Perilla seed	1727	Free	1.38¢ lb.	0
Poppy seed	762	16¢ per 100 lbs.	0	0
Rapeseed	1727	Free	2¢ lb.	0
Rubber seed	1727	Free	0	0
Sesame seed	1727	Free	1.18¢ lb.	0
Soybeans	762	2¢ lb.	0	0
Sunflower seed	762	2¢ lb.	0	0
Peanuts:				
Shelled	759	7¢ lb.	0	0
In the shell	759	4.25¢ lb.	0	0
Blanched, salted, or otherwise prepared	759	7¢ lb.	0	0
Tung nuts	1727	Free	0	0
Other seeds and nuts if oils therefrom are free	1727	Free	0	0

[1] Imports from Cuba receive a 20-percent reduction in rate. [2] Except when in excess of quota. [3] Oil brought into the U. S. from possessions or produced in the U. S. from copra imported from any country is not considered as imported and is therefore not subject to a duty. [4] This rate returns to 5 cents on June 30, 1946, or 30 days after the President proclaims that adequate supplies are again available in the Philippines. [5] Free of import tax if a Philippine article from May 1, 1946, to July 3, 1954. [6] Depends upon composition (if composed of taxable oils there may be an excise tax on imports). [7] On contents and container. [8] Except when used for manufacturing rubber substitutes or lubricating oils. [9] An emergency reduction that will terminate 30 days after the President of the U. S. proclaims that the emergency has ended.